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ENGINEER INTELLIGENCE STUDY

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THE PORT OF NIKOLAYEV, USSR (U)

A TECHNICAL SERVICE INTELLIGENCE DOCUMENT

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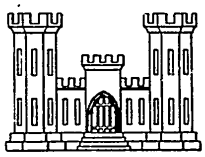

PREPARED UNDER THE DIRECTION OF THE
CHIEF OF ENGINEERS
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WASHINGTON 25, D. C.

FEBRUARY 1958

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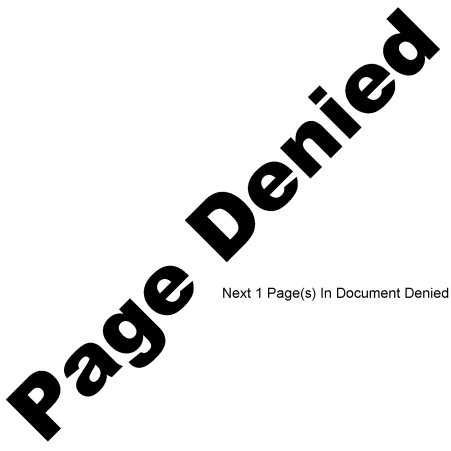

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PORT OF NIKOLAYEV, USSR

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PORT OF NIKOLAYEV, USSR

EXPLANATORY NOTES

Anchorages

Anchorages are given where appropriate in the following classes:

Class II	500-yard diameter	30-foot depth
Class III	300-yard diameter	20-foot depth
Class IV	200-yard diameter	15-foot depth

Usable berthing space

Wharves with alongside depths of 5 feet or more at mean low water are the only facilities listed.

The following classification of wharf berths is used in this report:

Class A-type - (Liberty-Victory) (C2 and C3) Length of 460 to 500 feet with depths of 24 to 29 feet alongside.

Class B-type - (Large coaster) Length of 350 feet with depths of 19 to 24 feet alongside.

Class C-type - (Standard coaster) Length of 250 feet with depths of 16 to 19 feet alongside.

Class D-type - (Small coaster) Length of 200 feet with depths of 12 to 16 feet alongside.

Lighter - Length of 100 feet with depths of 5 to 12 feet alongside.

Facilities included

Wharves known to handle general cargo, or believed to be suitable for handling general cargo, are listed as general cargo wharves. However, where there are minor facilities for handling grain, coal, or petroleum products on a general cargo wharf, the wharf is classified as a general cargo facility. When a wharf is

EXPLANATORY NOTES - Continued

used exclusively for fitting out, coal, grain, petroleum, repair, and other special uses, it is classified and tabulated as such.

Distances

Unless otherwise stated, distances are expressed in yards or nautical miles.

Depths of water and heights above water

Expressed in feet. In presenting navigation and construction features, depths of water and heights above water are in terms of chart datum (zero tide).

Construction details

Expressed in feet. Slopes of embankments, breakwaters, etc. are expressed in the text in terms of the horizontal base to the vertical rise as 3 to 1 or 4 to 3.

Harbor areas

For less than 1 square nautical mile, areas are listed in acres. Over 850 acres, the areas are listed in terms of square nautical miles.

Covered storage space

The total area in warehouses, storage buildings, and similar structures is given in square feet of floor area. No deduction is made for aisle, fire, elevator, or other such space.

Place names

The latest available designation for places and areas is given. English terms for words such as wharf, bay, canal, and basin have been given preference.

Estimated military unloading capacity

The estimated military unloading capacity of a port is determined on the following basis:

One long (2,240-pound) ton of general cargo handled in a

EXPLANATORY NOTES - Continued

20-hour day for each linear foot of usable general cargo wharf. However, this estimate has been reduced, in some cases, to compensate for local conditions which restrict cargo handling operations.

Potentialities for expansion

Description of the expansion possibilities of the port to increase the military discharge capacity. The phased program to be used as a guide for planning purposes is as follows:

Phase I - The repair, improvement, and modernization of existing facilities, including minor dredging.

Phase II - Improvements such as the construction of additions or extensions to existing wharves or piers, including dredging requirements.

Phase III - Suggestions for the location of new piers or wharves.

Points of vulnerability

The points of vulnerability in the port are those which if rendered useless by any means, in whole or in part, would adversely affect the present and ultimate capacity of the port.

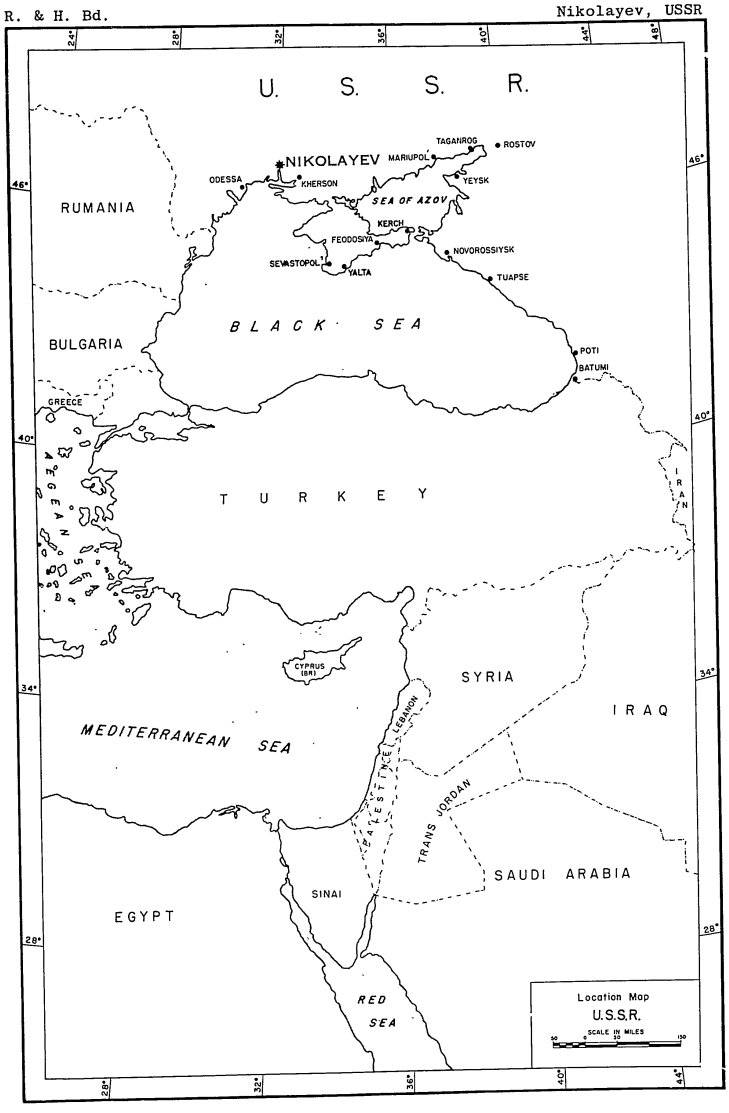


FIGURE 1

R. & H. Bd. Nikolayev, USSR

Uncontrolled aerial mosaic of Nikolayev.

German Aerial March 1943 - June 1944

FIGURE 2

R. & H. Bd.

Nikolayev, USSR
(46°58'N, 32°00'E)

1. Introduction

Nikolayev is located on the left bank of the Yuzhnyy Bug River about 23 nautical miles north of its entrance into the Dneprovskiy Liman, an arm of the Black Sea. It is situated on a peninsula formed by the confluence of the Yuzhnyy Bug and Ingul Rivers. (Figure 1) The city is located north of the commercial harbor and is the second largest center for the building and repair of combat ships in the USSR, ranking next to Leningrad. As a commercial port it ranks second to Odessa in the Black Sea area, with respect to the annual volume of freight turnover. Nikolayev serves as an export center for products of the Ukraine; however, in recent years the emphasis has been shifted to coastal trade. Coastal and river traffic consists chiefly of the regional transportation of agricultural products and building materials from local areas, and imported petroleum products and timber. Nikolayev's principal industries are the building and repair of combat ships, and the production of earth-moving machinery; minor industrial installations include sawmills and food-processing plants. Rural communities are occupied mainly with dairy farming, flour milling, and sugar refining. The chief crops are wheat, hemp, cotton, castor beans, and vegetables. The principal exports are iron ore, manganese ore, and grain; principal imports are timber, petroleum, manufactured goods, and ferroalloys.

The population of the city of Nikolayev was 225,000 in 1956.

Demolition activities during World War II caused heavy damage to industrial installations and port facilities. The reconstruction of industrial installations is probably complete,

however, no trend toward expansion has been apparent other than in the shipbuilding industry. The port facilities have been substantially restored and a limited degree of expansion has occurred.

2. Harbor

a. Summary

The improved river harbor begins on the Yuzhnyy Bug River south of the city, and continues around the peninsula a distance of 9 nautical miles to a position on the Ingul River north of the city, which is about 1.6 nautical miles east of the confluence of the Ingul and Yuzhnyy Bug Rivers. The Yuzhnyy Bug ranges in width from 0.7 to 1.6 nautical miles, while the Ingul is about 1 nautical mile at its widest part-its entry into the Yuzhnyy Bug. The total water area is about 9 square nautical miles over general depths of 25 to 30 feet. (Figures 2 and 3)

b. Approach

The approach from the open waters of the Black Sea is through the Dneprovskiy Liman, and thence up the Yuzhnyy Bug. Pilotage is compulsory.

c. Entrance

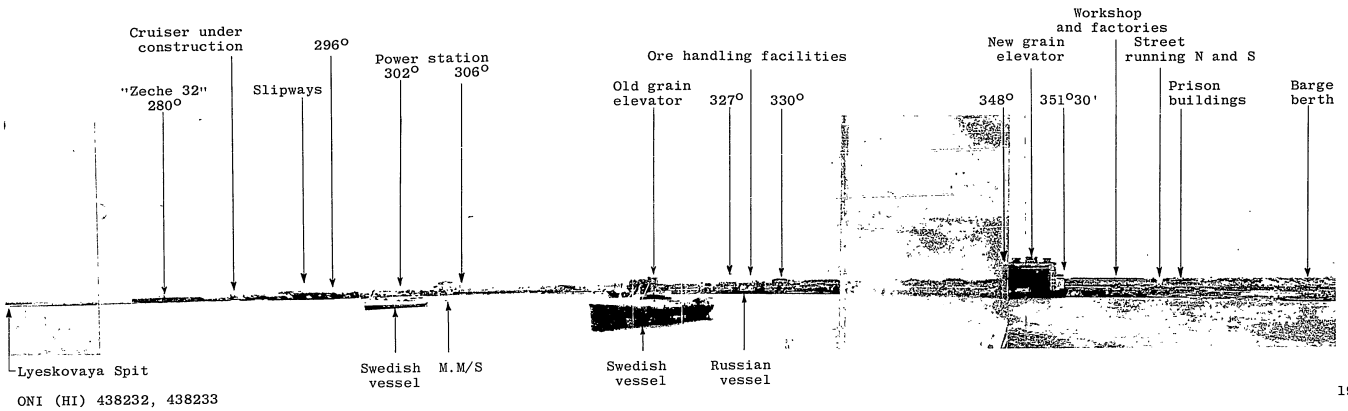
Nikolayev is reached by a dredged channel with a width of 330 to 350 feet, and a charted depth of 27 to 30 feet. This channel, about 37 nautical miles in length, is through the Dneprovskiy Liman and Yuzhnyy Bug. It was neglected during World War II, however, postwar dredging operations have restored the depth so that vessels drawing up to 27 feet can pass.

A 29-foot channel, marked by spar buoys surmounted by cones, leads to the shipbuilding works westward of the Coastwise Trade Mole.

R. & H. Bd.

Nikolayev, USSR

Panoramic View of the Harbor of Nikolayev
Taken from Position 46°56'22"N, 32°00'38"E



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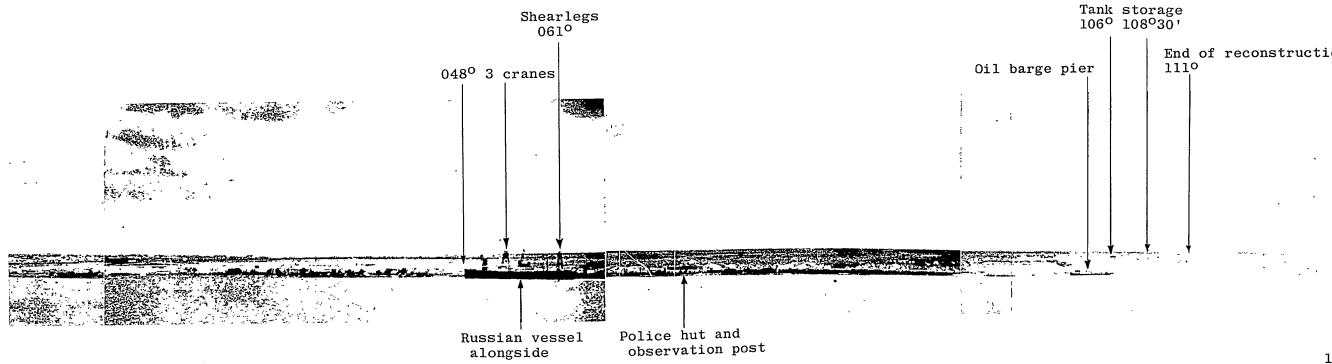

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FIGURE 3
PAGE 11

d. Breakwaters and other protective works

There are no breakwaters or other portective works at Nikolayev.

e. Dimensions, shape, and water area of each basin

The commercial harbor is composed of riverside quays, with the exception of the basin formed by the Coastwise Trade Mole. Other basins include 2 fitting-out basins in the South Shipyard, 1 fitting-out basin in the North Shipyard, small craft basins at Varvarovka and immediately north of the Yuzhnyy Bug River bridge, and the Naval Club boat basins. The table on the following page gives the details of the basins.

Basins

Name	Configuration	Location	Dimensions (feet)	Area (acres)	Depths (feet)	Use
Large fitting-out basin	Rectangular.	SW of city and W of Constwise Trade Mole.	1,000 by 840	19.30	21	Fitting out.
Small fitting-out basin	do	E of large fitting-out basin.	400 by 120	1.10	n a	do
Varvarovka	Semicircular.	W side of Yuzhnyy Bug River bridge.	Max. width 1,200 Max. length 800	9.20	3 to 7	Anchorage for local river traffic.
U-shaped basin	U-shaped.	W side of city and N of Yuzhnyy Bug River bridge.	300 by 200	1.20	n a	River craft.
Naval Club boat basins	2 rectangular basins.	About 1,000 yd. S of Yuzhnyy Bug River bridge on E bank of river.	180 by 135 165 by 100	0.90	4 to 6	Small pleasure craft basin.
Coastal Trading Harbor	Yoke-shaped.	S of city in W portion of commercial harbor.	Max. width 12,800 Max. length 15,600	5.10	12 to 23	Anchorage for small vessels.
Small fitting-out basin	Rectangular.	N of city on Ingul River.	470 by 50	0.54	n a	Fitting out.

TABLE I

f. Liability to silting, dredging required, composition of bottom

The Yuzhnyy Bug River, in its lower reaches, deposits very little sediment, and requires only sporadic dredging. The sections which require dredging are the area surrounding the harbor bar, and the area south and west of the city along the river bank. The composition of the bottom consists of sand in the shoal areas and mud in the deeper portions of the river bed.

g. Bridges and other obstructions crossing navigable parts of harbor

The Yuzhnyy Bug River highway bridge and the Ingul River highway bridge cross navigable portions of the harbor. Both bridges interfere with river traffic to and from the North Yard, however, only 1 interferes with river traffic to and from the upper reaches of the Yuzhnyy Bug. The Yuzhnyy Bug River bridge is located to the northwest of the city. This structure is a floating highway bridge of timber construction, 2,865 feet long, with a movable channel section about 100 feet long. It connects with a causeway on the jetty of Varvarovka which is located on the west side of the river. The Ingul River highway bridge, also of timber construction, is 656 feet in length and has a movable floating center section of about 280 feet. It is located north of the city just west of the North Shipyard.

h. Anchorages

Vessels are not allowed to lie at anchor in the roadstead, but go alongside the quays in the commercial harbor where depths are 25 to 29 feet. The commercial harbor area is well protected from winds, and is believed to have good holding ground over black mud. Warships anchor at the confluence of the Ingul and Yuzhnyy Bug Rivers in depths of about 15 to 20 feet.

Ships arriving after nightfall must anchor at the mouth of the river before proceeding upstream to Nikolayev.

i. Hydrographic conditions affecting navigation

Tides at Nikolayev are negligible, but winds and sudden atmospheric pressure changes can raise or lower the water level 3 feet. Also, the water level is raised by the discharge of the Yuzhnyy Bug, particularly during spring freshets. Tidal currents are negligible and waves are less than 2 feet high. In an average year the ice thickness on the Yuzhnyy Bug is 14 inches with a maximum thickness of 24 inches. This ice occurs in mid-December and is cleared by early March. Icebreakers keep the port open to navigation throughout the winter. Fog occurs on an average of 34 days a year.

3. Wharves

a. Summary

The commercial wharves in the port occupy approximately 1.8 nautical miles of waterfront on the Yuzhnyy Bug River south of the central part of the city. These wharves handle general cargo, grain, ore, limestone, oil, coal, sugar, and passengers. Farther upstream in the Yuzhnyy Bug River there are additional wharves with 3,820 linear feet of berthage capable only of handling river craft.

The naval shipbuilding facilities are located south of the city on the Yuzhnyy Bug, and north of the city on the Ingul River. The South Yard, located west of the commercial harbor, covers about 475 acres of land, while the North Yard covers about 130 acres of land.

b. Types of wharf facilities

Commercial wharf facilities are reinforced concrete and masonry quays retaining solid fill. They consist of

10,990 linear feet of usable berthing space for handling general and other cargoes.

The naval fitting-out and repair berths consist of approximately 5,850 linear feet of masonry-faced quays, of which about 4,850 linear feet are believed capable of handling general cargo.

c. Wharf footage by usage, by depths

(1) Commercial facilities - The general cargo facilities have 8,965 linear feet with depths of 24 feet or over alongside, 1,085 linear feet with depths of 19 to 24 feet alongside, 400 linear feet with depths of 16 to 19 feet alongside, and 540 linear feet with depths of 12 to 16 feet alongside.

(2) Naval facilities - The naval wharves at the North and South Shipyards comprise 2,350 linear feet of wharves with depths of 24 feet or over alongside, about 2,500 linear feet with depths of 19 to 24 feet alongside, and about 1,000 linear feet with unknown depths.

d. Vessel accommodation by class at commercial wharves

Commercial facilities at Nikolayev provide berthing accommodations for 14 Class A-, 3 Class B-, 3 Class C-, 8 Class D-type vessels, and 3 lighters for handling general cargo.

e. Estimated military port capacity

The estimated military unloading capacity at Nikolayev is 10,900 long tons of general cargo based on a 20-hour effective working day.

A phased study of the port's expansion possibilities indicates that the capacity could be increased about 3,100 long tons.

f. Tabular details and photos

The known details of the quays are shown in the table of Wharves (Piers, Quays, etc.) under 7 reference numbers. The same numbers are used to designate their locations on the port plan, Figure 31. Photographs are shown opposite individual commercial wharf references; naval wharf photography is included in the groupings of photographs pertaining to the shipyards.

View looking WNW showing westernmost portion of the Coastwise Trade Mole (wharf Ref. 1). Shipbuilding slips of the South Yard are shown in the background. 1942

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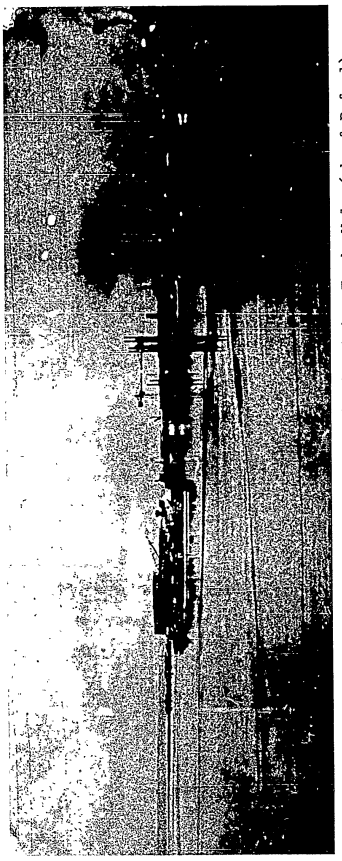
FIGURE 4

R. & H. Bd. Nikolayev, USSR



View looking W showing easternmost portion of the Coastwise Trade Mole (wharf Ref. 1).
ONI (HI) 445855

FIGURE 5

R. & H. Bd. Nikolayev, USSR

Wharves (Piers, Quays, etc.)

Details of Wharf	Coastwise Trade Mole		
Ref. on Port Plan	1		
Use	General cargo, oil, and passengers.		
Type and Construction	L-shaped reinforced concrete mole.		
Load Capacity of Deck	n a		
Height of Deck above Water (feet)	6		
Dimensions (feet):	N Side	S Side	E Face
Length overall	2,025	1,050	225
Usable berthing space	2,025	1,050	225
Depths alongside	13 to 24	24	24
Width of apron	Open.	Open.	Open.
Berthing Capacity	3 - B, 1 - C, 3 - D, 1 lighter	5 - D, 1 lighter.	
Transit Sheds (number):	4		
Construction	Wooden frame and siding.		
Dimensions	n a		
Number of floors	Probably single story.		
Total floor area	n a		
Handling Facilities	n a		
Railroad Facilities	2 single tracks (5'-gage) run entire length of mole.		
Road Clearance	Truck access.		
Utilities:			
Water	Available.		
Electricity	n a		
Potentialities for Expansion	...		
Remarks	Mole contains new passenger, telephone, and telegraph stations. Accommodates coastal and river traffic.		

TABLE II

Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	Granite Quay
Ref. on Port Plan	2
Use	General cargo, grain, ore, sugar, and limestone.
Type and Construction	Masonry quay.
Load Capacity of Deck	n a
Height of Deck above Water (feet)	6
Dimensions (feet):	
Length overall	4,090
Usable berthing space	4,090
Depth alongside	27
Width of apron	Open.
Berthing Capacity	8 Class A, 1 lighter.
Transit Sheds (number):	1
Construction	Wooden frame and siding.
Dimensions	n a
Number of floors	1
Total floor area	n a
Handling Facilities	Four 4-ton electric traveling cranes; new grain elevator, 41,000-ton capacity; old grain elevator, 13,000-ton capacity.
Railroad Facilities	W portion of quay is served by a double-track line, and E portion by a single-track line. Both are 5'-gage.
Road Clearance	Truck access.
Utilities:	
Water	Available.
Electricity	n a
Potentialities for Expansion	Westward extension of quay appears feasible under Phase II. Par. 12. c.
Remarks	...

View looking ENE along Granite Quay (wharf Ref. 2). Old grain elevator shown in left foreground. New grain elevator shown in right background.

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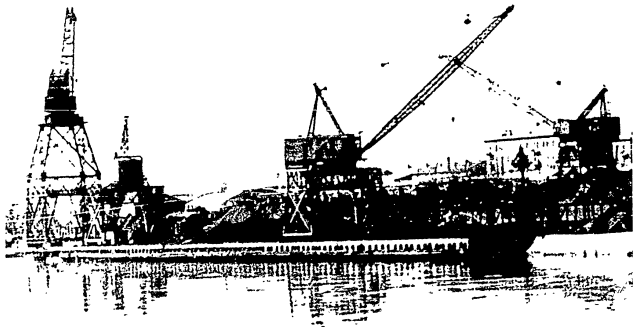

View looking NW showing ore handling facilities located on Granite Quay between old and new grain elevators.

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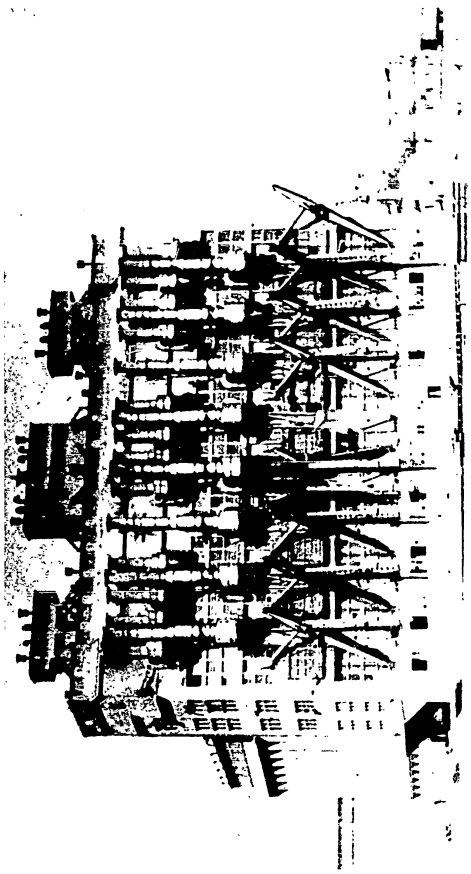

View looking NNE showing new grain elevator located at the eastern end of Granite Quay (wharf Ref. 2).

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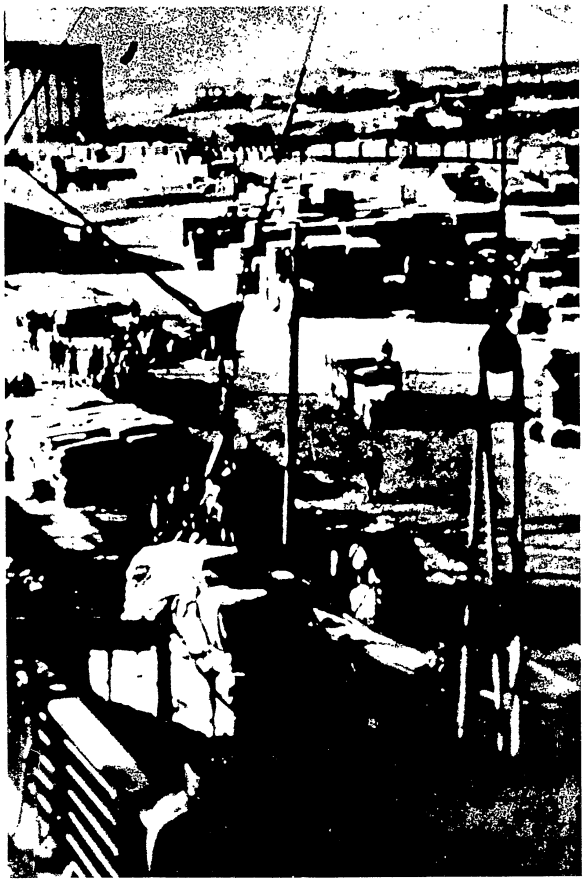
FIGURE 7

R. & H. Bd. Nikolayev, USSR



View looking NW showing cargo being unloaded at City Quay (wharf Ref. 3). Portion of new grain elevator can be seen in left background.

USAF 2210.743 1943

FIGURE 8

R. & H. Bd. Nikolayev, USSR

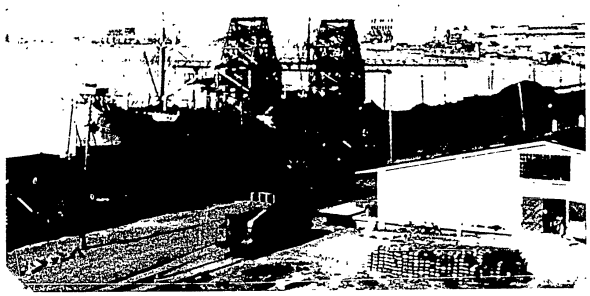
Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	City Quay
Ref. on Port Plan	3
Use	General cargo, coal, ore, and bunkering oil.
Type and Construction	Reinforced concrete quay.
Load Capacity of Deck	n a
Height of Deck above Water	n a
Dimensions (feet): Length overall	1,820
Usable berthing space	1,820
Depth alongside	27
Width of apron	Open.
Berthing Capacity	3 Class A, 1 Class C.
Transit Sheds (number):	1
Construction	n a
Dimensions	n a
Number of floors	Probably single story.
Total floor area	n a
Handling Facilities	n a
Railroad Facilities	A single-track (5'-gage) line runs entire length of the quay.
Road Clearance	Truck access.
Utilities: Water	Available.
Electricity	n a
Potentialities for Expansion	Improvement of western end, Phase II. Par. 12. c.
Remarks	There is a 3-track (2 single and 1 double) railroad-car-storage yard (length 1,150 ft.) at rear of quay.

TABLE II

Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	International Quay
Ref. on Port Plan	4
Use	General cargo, coal, ore, and bunkering oil.
Type and Construction	Reinforced concrete quay.
Load Capacity of Deck	n a
Height of Deck above Water	n a
Dimensions (feet):	
Length overall	1,780
Usable berthing space	1,780
Depth alongside	27
Width of apron	Open.
Berthing Capacity	3 Class A, 1 Class C.
Transit Sheds (number):	1
Construction	Reinforced concrete.
Dimensions	n a
Number of floors	1
Total floor area	n a
Handling Facilities	Three 3-ton, electric traveling cranes. One shearlegs.
Railroad Facilities	Single-track (5'-gage) line on quay.
Road Clearance	Truck access.
Water and Electricity	...
Potentialities for Expansion	Develop left bank of Yuzhnyy Bug under Phase III. Par. 12. d.
Remarks	...



View looking NW from International Quay (wharf Ref. 4). Old and new grain elevators shown in background. City Quay is in extreme right background. Tower transporters in center presumably have been supplanted by electric traveling cranes.

AMS 12625 1943

View looking E showing portion of International Quay. Pile-driver and railroad cars are shown to the left; shearlegs to the right.

1950

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R. & H. Bd. Nikolayev, USSR

Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	Large Fitting-out Basin of South Yard
Ref. on Port Plan	5
Use	Naval fitting-out and repair.
Type and Construction	Masonry-faced quayage.
Load Capacity of Deck	n a
Height of Deck above Water	n a
Dimensions (feet): Length overall	3,000
Usable berthing space	About 3,000
Depths alongside	24 or over - 500 19 to 24 - 2,500
Width of apron	n a
Berthing Capacity	...
Transit Sheds	...
Handling Facilities	15 to 20 locomotive cranes, and 2 floating cranes--1 of 150 tons--are in use at the South Yard.
Railroad Facilities	Single track (5'-gage) along N side and on oil-bunkering pier.
Road Clearance	Restricted access.
Water and Electricity	Available.
Potentialities for Expansion	...
Remarks	Refer to Figs. 17 through 20 for photographs of this basin. 350-ft. oil bunkering pier (Fig. 20) extends W from SE corner of basin.

Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	Small Fitting-out Basin of South Yard
Ref. on Port Plan	6
Use	Naval fitting-out and repair.
Type and Construction	Masonry-faced quayage.
Load Capacity of Deck	n a
Height of Deck above Water (feet)	10
Dimensions (feet): Length overall	1,000
Usable berthing space	About 1,000
Depth alongside	n a
Width of apron	40
Berthing Capacity	...
Transit Sheds	...
Handling Facilities	One shearlegs, 15 to 20 locomotive cranes, and 2 floating cranes--1 of 150 tons--are in use at the South Yard.
Railroad Facilities	Double tracks (5'-gage) on sides of basin.
Road Clearance	Restricted access.
Water and Electricity	Available.
Potentialities for Expansion	...
Remarks	Refer to Figs. 17 through 21 for photographs of this basin.

Wharves (Piers, Quays, etc.)-Continued

Details of Wharf	Fitting-out Quay at North Yard
Ref. on Port Plan	7
Use	Naval fitting-out and repair.
Type and Construction	Masonry-faced quay.
Load Capacity of Deck	n a
Height of Deck above Water	n a
Dimensions (feet): Length overall	1,850
Usable berthing space	1,850
Depth alongside	26
Width of apron	n a
Berthing Capacity	...
Transit Sheds	...
Handling Facilities	Ten 3- to 4-ton locomotive cranes, one 40-ton floating crane.
Railroad Facilities	One single track (5'-gage) runs length of quay.
Road Clearance	Restricted access.
Water and Electricity	Available.
Potentialities for Expansion	None.
Remarks	Refer to Figures 23 through 25 for photographs of this quay.

4. Mechanical handling facilities

a. Cranes ashore and afloat

(1) Cranes ashore - The exact number of cranes on the general cargo wharves at Nikolayev is not known. The known cranage includes 7 electric traveling cranes (four 4-ton and three 3-ton), several 3-ton steam locomotive cranes, and 1 shear-legs. Additional 3- to 4-ton steam locomotive cranes located in the shipyards could be used at any location in the port where the 5-foot-gage tracks exist.

(2) Floating cranes - Nine floating cranes are located at the port. These include 1 of 150-ton capacity, 1 of 50-ton capacity, 5 of 25- to 40-ton capacities, 1 of 17-ton capacity, and 1 of 3-ton capacity. (Figures 10 and 11)

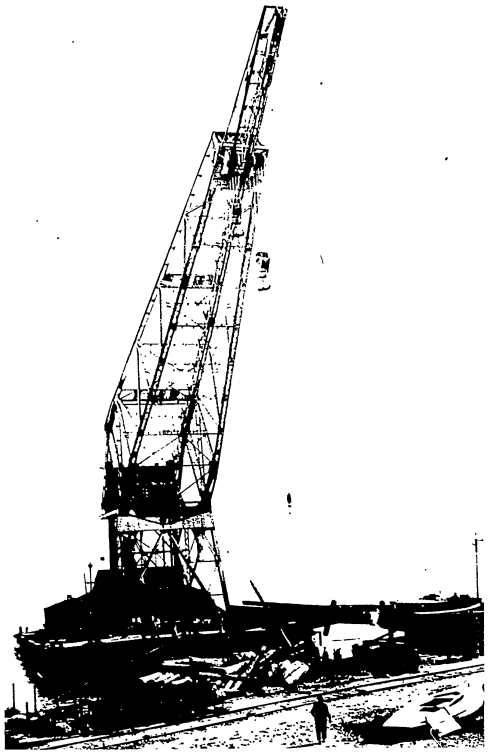
b. Specialized handling equipment

The known specialized handling equipment consists of 3 floating grain elevators. Prior to World War II, Nikolayev's specialized handling equipment included a bridge transporter and 2 tower transporters which were used for coal and/or ore loading. This equipment is believed to have been supplanted by electric traveling cranes.

5. Port maintenance and engineer equipment afloat

a. Tugs

An unconfirmed report indicates there are about 15 to 20 tugs in the port area. Two of the tugs in operation have reported ratings of 500 to 600 horsepower, and estimated lengths of 60 to 70 feet. A principal function of the tugs at Nikolayev is to remove completed hulls from the shipbuilding ways. (Figure 12)



View looking SSW of 150-ton floating crane in operation within the large fitting-out basin of the South Yard.

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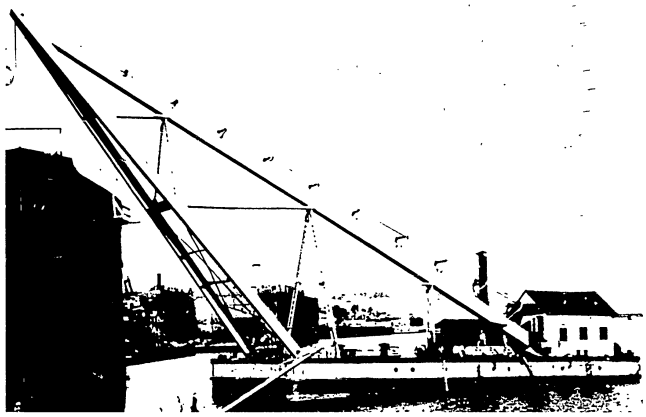
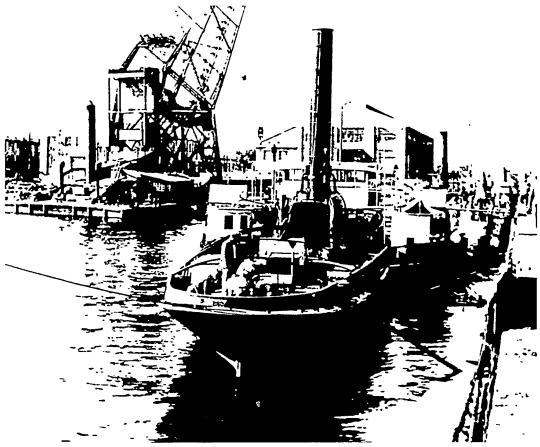
R. & H. Bd. Nikolayev, USSR



View looking W of 40-ton floating crane operating in the vicinity of the North Yard. At left is German vessel "Cherson". Floating drydock can be seen in background.

ONI (HI) 459559 1943

R. & H. Bd. Nikolayev, USSR



View looking N in large fitting-out basin of South Yard showing Russian paddle wheel tug. 150-ton floating crane can be seen in background.

ONI (HI) 459539

R. & H. Bd. Nikolayev, USSR

View of floating piledriver. Salvaged tanks can be seen to the right.

1950

FIGURE 13

R. & H. Bd. Nikolayev, USSR

b. Dredges

A diesel-powered, self-propelled bucket conveyor dredge has been reported in operation on the Ingul River to the north of the North Shipyard. Two steam-powered, non-self-propelled dredging barges also have been reported in operation in the immediate vicinity of the 2 shipyards.

c. Piledrivers

The services of a floating piledriver are available at the port. (Figure 13)

d. Block handling cranes

No data are available.

e. Salvage equipment

Tank production for the purpose of salvaging vessels was reported at the North Yard. These tanks, which are about 23 feet long and 6.5 feet in diameter, were shipped to unknown points, but they could be available at Nikolayev if needed. Two types of diving equipment were observed in use at the North Yard. These consisted of a diving suit into which air was pumped from a boat, and a diving suit to which an oxygen bottle was attached.

50X1

f. Fireboats

Four fireboats are available at Nikolayev.

g. Icebreakers

Two steam-propelled icebreakers are in operation at the port. One is believed to have a rating of 600 horsepower, and a length of 130 feet.

6. Hards and unimproved sites usable for cargo landing within the port

Data are insufficient to determine the feasibility of using unimproved sites for cargo landing purposes. However, the left shoreline of the Yuzhnyy Bug River from Leskovaya Spit to

the Yuzhnyy Bug River bridge - about 6,120 yards in length - probably could be utilized as a cargo landing site. This shoreline, with few exceptions, is clear of obstructions and has an offshore bottom sediment of sand for its entire length.

From Leskovaya Spit to Spasskaya Spit the shoreline is covered with weeds. The river bed has a uniform slope outward from the shoreline until a deep drop varying from 110 to 1,260 yards offshore is encountered. The depths immediately offshore range from 1 to 4 feet; depths on the shallow side of the drop are from 4 to 6 feet, and the depths on the deep side of the drop are from 20 to 28 feet. The remaining shoreline, from Spasskaya Spit to the Yuzhnyy Bug River bridge, is covered with trees and villas and exhibits hydrographic properties similar to those of the preceding shoreline section. The river bed here also deepens gradually to depths of 6 to 17 feet at 100 to 700 yards offshore. Along this line a drop is also encountered reaching depths of 21 to 23 feet.

Clearance from this area could conceivably be achieved by the utilization of a single-track, 5-foot-gage rail line, and a road which are located nearby. Both rail line and road extend southwestward from the Yuzhnyy Bug River bridge and cover about 1,950 and 4,280 yards of shoreline, respectively. The rail line is situated from 140 to 470 yards inland; the road, from 90 to 400 yards inland.

7. Storage facilities

a. General cargo warehouses

Situated throughout the port are 17 warehouses which provide Nikolayev with an approximate minimum total of 294,000 square feet of general cargo storage space. The majority of these buildings are concentrated in a small area lying immediately

north of Granite Quay (wharf Ref. 2). All warehouses are believed to be served by rail and road.

North of the North Yard, on the peninsula formed by the Ingul and Yuzhnyy Bug Rivers, is the Nikolayev Airfield. This airfield has 4 storage buildings which are used as a food depot for the city. Other food storing facilities are located in the commercial port area, where 5 semiburied warehouses, each 80 by 25 feet, provide a total storage area of 10,000 square feet. A third food storage area lies across the Yuzhnyy Bug River north of Varvarovka. Near the boat landing there are 16 storage buildings with an area of 14,580 square feet believed to be used for food storage.

b. Bulk warehouses, other than grain and tank storage

No data are available.

c. Cold storage facilities

No data are available.

d. Tank storage

(1) Petroleum and products - On the left bank of the Yuzhnyy Bug River, opposite the harbor bar, there are 6 large and 3 small new storage tanks, and 17 flat-roof semiburied storage tanks from 20 to 84 feet in diameter. All tanks are served by river transportation. (Figure 14)

About 970 yards north of the large fitting-out basin in the South Yard are 18 tanks which store fuel oil, gasoline, and kerosene from Odessa, primarily for local consumption. Nine of the tanks are 69 feet in diameter and 28 feet high, and 9 are 20 feet in diameter and 27 feet high. The total estimated maximum capacity of these tanks is about 180,100 barrels.

The South Yard is served by 4 oil tanks of unknown capacities. In the shipbuilding section of the yard

there are 2 oil tanks each 35 feet in diameter, and in the area of the steel plants are 2 additional oil-storage tanks, 35 and 70 feet in diameter.

An underground depot, with a reported capacity of 250 barrels, is located in the northeast section of the North Yard. Rail and road clearance are available.

Nikolayev Airfield which is across the Ingul River from the North Shipyard, and Nikolayev/Kubakino Airfield located about 4 miles southwest of Nikolayev are the sites of tanks. At Nikolayev Airfield 3 fuel tanks measure 18 feet in diameter, and underground fuel and oil storage of an unknown capacity is available at Nikolayev/Kubakino Airfield.

Three small 18-foot-diameter tanks of unknown capacities are located just north of the Yuzhnyy Bug River bridge on the left bank of the river.

A probable petroleum storage area with 5 storage tanks, 35 to 40 feet in diameter, is situated beside a 2-track railroad siding about 6 statute miles south-southeast of the Coastwise Trade Mole (wharf Ref. 1).

(2) Other tank storage - Eight petroleum barges, each having a capacity for 9,600 barrels, are available for storage purposes.

e. Grain elevators

Two grain elevators are located on Granite Quay (wharf Ref. 2) in the commercial port at Nikolayev. The eastern and more modern structure consists of 3 elevators and 144 silos and has dimensions of 235 by 170 feet. It has a total capacity for 1,500,000 bushels and has been reported to have loaded at the rate of 46,000 bushels per hour. Loading is accomplished by means of 9 supply spouts which are capable of simultaneous delivery.

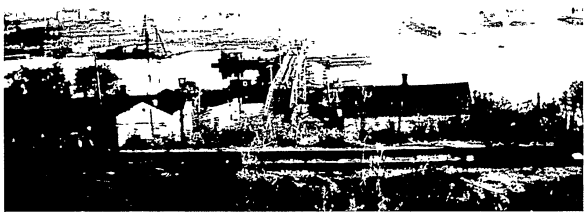
1950

View looking E showing petroleum storage tank center which is located S of International Quay. Pumphouse at right center foreground.

50X1

FIGURE 14

R. & H. Bd. Nikolayev, USSR



View looking NW showing highway bridge crossing the Yuzhnyy Bug River to Varvarovka.

AMS 4615 September 1942

FIGURE 15

R. & H. Bd. Nikolayev, USSR

Reports have indicated depths alongside this elevator range between 26 and 30 feet. The western grain elevator, a 200- by 80-foot structure, has a total capacity for 477,000 bushels. It is believed to contain 4 elevators, and loading appears to be accomplished by spouts extending from an overhead conveyor gallery system. This grain elevator was reported to be in disrepair and unusable, however, later reports indicate that it is to be repaired. Three floating grain elevators are in operation at Nikolayev, but information concerning them is not available. (Figure 6, upper photo, and Figure 7).

f. Open storage

There is ample open storage space to the rear of the quays in the commercial port which could be served by rail and road. The total open storage area of the port is about 44 acres.

8. Clearance facilities

a. Rail

(1) Lines clearing port - Nikolayev is served by 4 single-track, 5-foot-gage rail lines which provide connections with all parts of the USSR. One line leads north-northeastward to Znamenka via Dolinskaya, and another leads northeastward to Apostolovo via Snegirevka. A third line leads southeastward to Kherson, and thence to the Crimean Peninsula. The fourth line leads northwestward to Grigoresti where it is joined by a narrow-gage line from Varvarovka; from this point the single-track, 5-foot-gage line continues northwestward to Kudryavtsevo where it connects with another single-track, 5-foot-gage line, and then leads southward to Odessa.

(2) Rail facilities in port

(a) Waterfront and wharf - The wharves in both the commercial and naval sections of the port are served by

single- or double-track, 5-foot-gage rail spurs. In some cases the rail spurs are located some distance behind the berths. These various spurs connect to the main line in the Nikolayev railroad station, yards, and shops area located north of the South Shipyard. From this yard area the main rail line (double-track, 5-foot-gage) runs behind the quays in the commercial port and leaves the city at its southeastern end.

(b) Classification yards and team tracks - The Nikolayev railroad station, yards, and shops section, located north of the South Shipyard, contain the principal rail facilities of the city. The yards' area contains an 8-track, 2,810-foot-long classification yard, the only one serving the port area. Included also in this section are 6- and 4-track storage yards having lengths of 3,240 and 1,340 feet, respectively; a 4-track forwarding yard; a 6-track freight yard; and locomotive and car maintenance and repair facilities. There are 5 smaller storage yards serving local outlying sections, the largest of which is the Nikolayev Railroad Yards' "Vodopoy". This storage yard is 3,410 feet in length, contains 10 tracks, and is located about 2.5 statute miles east of International Quay (wharf Ref. 4).

b. Road

(1) Roads and highways clearing port - Nikolayev is served by 4 improved secondary roads which are linked with the road network of the region. Two of these roads are hard-surface, all-weather roads. One road, leading to Odessa 80 miles to the southwest, has a gravel surface and is about 39 feet in width. The other hard-surface, all weather road leads to Kherson, 40 miles to the southeast. The remaining 2 loose-surface, dry-weather roads extend in a northern direction; one leads northward to Kirovograd, and the other leads northwestward to Voznesensk.

(2) Streets and roads in town and port area - Paved roads clear the port area and connect with the principal streets of the city. The circulation of vehicular traffic within the port area is considered good.

The street pattern in Nikolayev is rectangular in design and allows unrestricted clearance through the city. Most of the city streets are paved with cobblestones; main streets have asphalt paving. Streets vary from about 16 to 39 feet in width, with the exception of the main street which has a width of about 98 feet. The condition of the streets in Nikolayev ranges from fair to poor.

Two highway bridges in the area carry principal clearance routes from the city. (Figures 15 and 16) One bridge, which spans the Yuzhnyy Bug River from the northwestern coast of Nikolayev to Varvarovka, carries the principal highway connection with Odessa. Pontons support this wooden structure which is 20 feet in width and 2,865 feet in length. The second wooden bridge, also partially supported by pontons, spans the Ingul River west of the North Shipyard and carries the principal road leading to Voznesensk. This bridge has a width of 15 feet, a length of 660 feet, and is in very poor condition. Both bridges have movable channel sections which open and allow the passage of river traffic. The construction of a third bridge was in progress (1948) in the vicinity of the North Shipyard pedestrian crossing. The completed portion of this structure rests on a timber pile foundation and is believed to be about 24 feet in width.

c. Inland waterways

The Yuzhnyy Bug River is navigable for small craft as far as Voznesensk, about 52 nautical miles upstream from

Nikolayev, and is the route used by river freight and regular freight-passenger lines.

d. Oil pipelines

No data are available.

9. Ship supplies

a. Fuel

Five known fueling sites are located within the Nikolayev port area; however, data concerning their capacities are not known. International Quay (wharf Ref. 4) and the Naval Fueling Station contain coal handling and petroleum bunkering facilities; the remaining 3 fueling sites are capable of transferring only 1 type of fuel (coal or petroleum). The oil-bunkering pier (Figure 20) and a petroleum storage area, located about 1.5 statute miles south of International Quay, have petroleum bunkering facilities. City Quay (wharf Ref. 3) is equipped with coal handling facilities.

b. Utilities

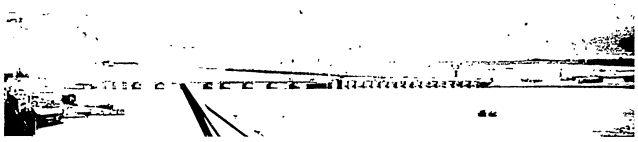
(1) Water - Water installations were repaired at the end of 1946 and fresh water is now believed to be available at all principal wharves, with the possible exception of the International Quay. Water is reported to be available in both shipyards, but the supply is unsatisfactory.

(2) Electricity - Electricity is believed to be available at most, if not all, of the quays, and is adequate at both shipyards. Distributed current characteristics are believed to be 3-phase, 50-cycle, 220/380-volt, a.c.

10. Shipbuilding and repair

a. Summary

Nikolayev has been an established shipbuilding center since 1900, and today ranks as the second largest shipbuilding and



View looking WNW of highway bridge crossing the Ingul River in the vicinity of the North Yard.

ONI (HI) 459573 1943

FIGURE 16

R. & H. Bd.

Nikolayev, USSR

View of the South Yard (Marti Shipyard No. 444) and surrounding area. Shipbuilding slipways and fitting-out and repair basins are at bottom center.

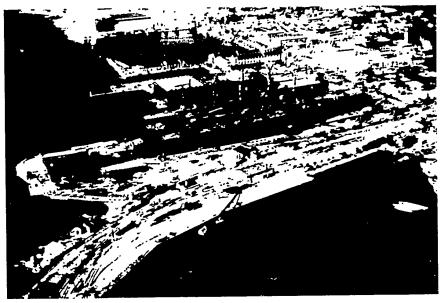
June 1944

ONI 46-61

FIGURE 17

R. & H. Bd.

Nikolayev, USSR



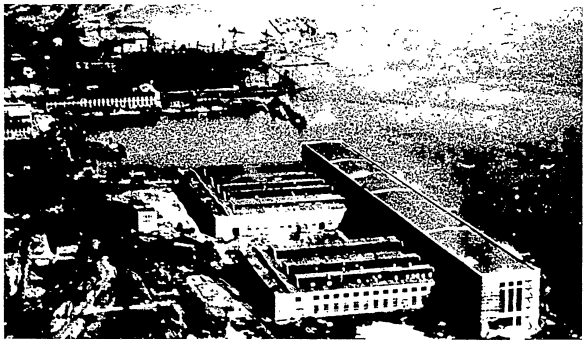
View looking WNW showing principal shipbuilding slipways of the South Yard.

1942

50X1

FIGURE 18

R. & H. Bd. Nikolayev, USSR

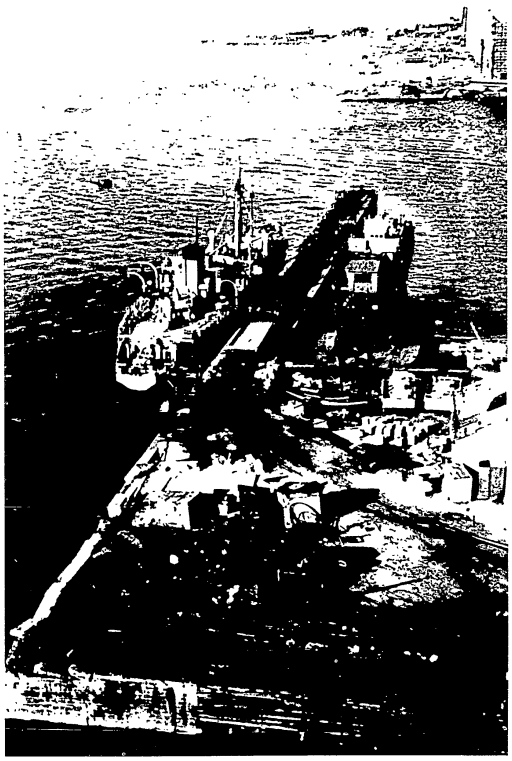


View looking E of southern portion of the South Yard. "Zeche 32" is shown in right foreground, and principal fitting-out and repair basin at left center.

ONI (HI) 459565 1943

FIGURE 19

R. & H. Bd Nikolayev, USSR



View looking NNW showing southernmost end of fitting-out and repair wharfage situated between the large and small fitting-out basins of the South Yard. Oil bunkering pier shown in center.

ONI (HI) 459548 1943

FIGURE 20

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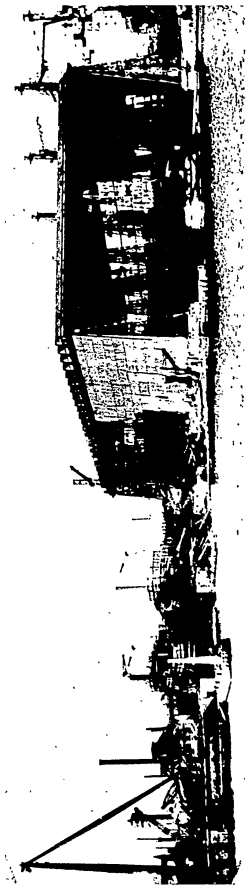
R. & H. Bd. Nikolayev, USSR

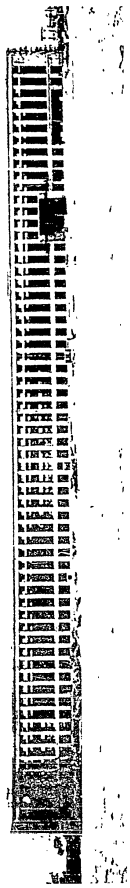


View looking N showing the 3 small and 2 medium-sized shipbuilding slipways of the South Yard. The 2 medium-sized ways are no longer covered. Portion of the 2 large shipbuilding slipways' cranage can be seen at extreme right. Shearlegs is shown at extreme left. 1943

ONI (HI) 459566

FIGURE 21

R. & H. Bd. Nikolayev, USSR

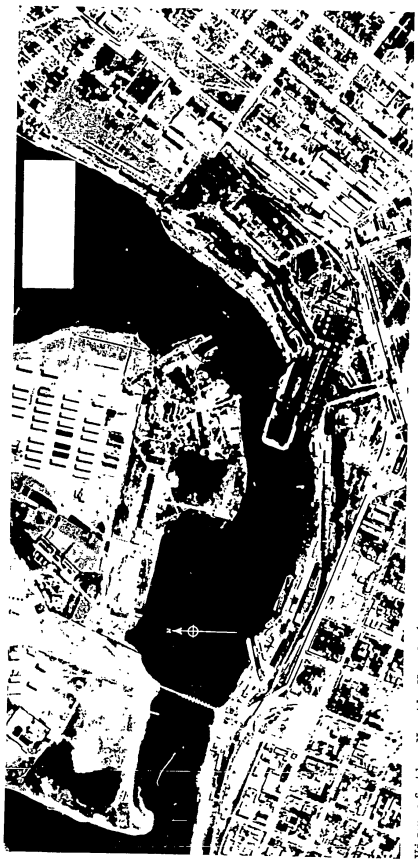


View looking N of "Zeche 32", submarine fabrication and assembly plant. Construction of a quay along shoreline shown has been indicated. 1943

ONI (HI) 459550

FIGURE 22

R. & H. Bd. Nikolayev, USSR



View of the North Yard (Imeni 61) and surrounding area. Fitting-out and repair quay is located in center portion of photo between marine railway slip and shipbuilding slipways. May 1943

ONI 46-61

FIGURE 23

R. & H. Bd. Nikolayev, USSR

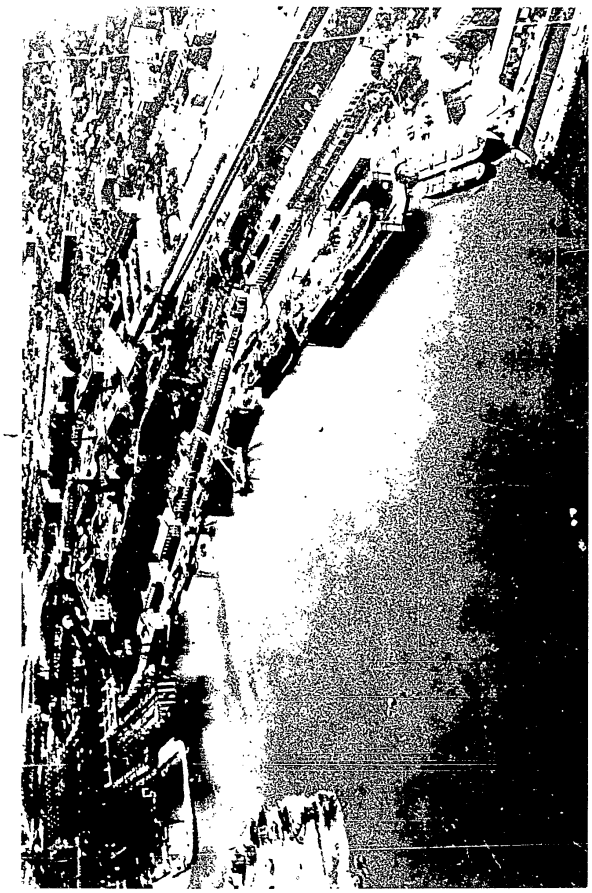
repair center for combat ships in the USSR. It is also the major shipbuilding and repair center for naval vessels in the Black Sea area. The facilities at Nikolayev account for 12.5 percent of the USSR capacity for the construction and repair of combat ships. Nikolayev contains 2 principal shipyards, the "Sudostroitelny I Mekhanicheski Zavod Imeni Andre Marti", also referred to as the Marti Shipyard No. 444 or the South Yard, and the "Sudostroitelny Zavod Imeni 61", referred to as Imeni 61 or the North Yard. The Spassk Shipyard, a minor installation, is located in this area.

The principal shipbuilding and repair facilities at Nikolayev comprise 10 major shipbuilding ways, approximately 5,850 linear feet of wharfage usable for fitting-out and repair purposes, 3 floating drydocks, and a complement of shipyard cranes of various types and capacities. These facilities are believed to be capable of constructing all types of naval and commercial vessels. In addition, Nikolayev's repair facilities are believed to be capable of accomplishing practically all above-water repairs as well as a limited amount of underwater repairs.

(1) Principal shipbuilding and repair yards

(a) South Yard (Marti Shipyard No. 444) - The South Yard is located southwestward of the city proper and immediately westward of the Coastwise Trade Mole (wharf Ref. 1). The yard extends along the left bank of the Yuzhnyy Bug River for about 1 statute mile, and covers an approximate area of 475 acres. The South Yard is the principal shipyard in the Black Sea area and also one of the largest shipbuilding installations in the USSR; it is comparable to the Baltic Shipyard in Leningrad. Facilities include 7 shipbuilding ways: the 2 largest have approximate lengths of 985 feet and 820 feet, and of the remaining five, 2 have approximate lengths of 490 feet, and 3 have approximate

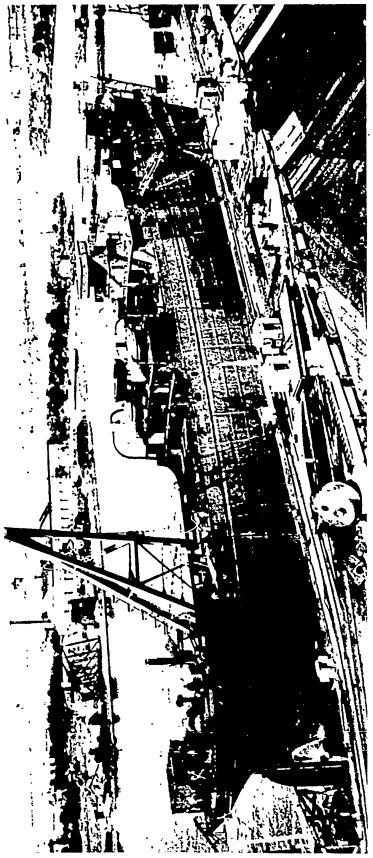
lengths of 360 feet. In addition, there are 2 fitting-out basins providing approximately 4,000 linear feet of masonry-faced quayage, of which about 2,550 linear feet are rail served. (Figures 17 through 21) The South Yard is also believed to have 2 floating drydocks, 8 tower cantilever cranes, 15 to 20 locomotive jib cranes, 2 floating cranes, and possibly a number of bridge cranes. The Siemens-Martin steel mill and a full complement of shops located within the yard area produce almost all required ship components. These shops are capable of manufacturing a variety of products not directly connected with shipbuilding. The reported total annual prewar production of the Siemens-Martin steel mill varies from 77,100 tons to 91,300 tons. However, the total annual postwar production is estimated to be considerably higher. The shipyard's prewar consumption is believed to have been about 10 percent of the steel mill's prewar production. "Zeche 32" plant (Figure 22), another important subdivision of the South Yard, is located in the southwestern section of the yard immediately westward of the large fitting-out basin. This installation is believed to be engaged in the construction of submarine hulls. The South Yard receives its electric power from 2 principal sources, the Nikolayev municipal thermoelectric power plant and the shipyard's own thermoelectric power plant. The Nikolayev municipal power plant is capable of generating about 67,000 kilowatts, and is tied in with the Dnepr-Donets power grid system; the shipyard power plant probably generates between 2,250 and 3,000 kilowatts. The shipyard's principal source of water is the Yuzhnyy Bug River. Recent reports have indicated that the quantity of water supplied is adequate. The South Yard has at present an estimated total labor force of 35,000 to 45,000 workers. There is little indication as to the composition of the yard's present



View looking ESE showing southern division of the North Yard. Shipbuilding slipways are in left background; marine railway slip in right foreground; and fitting-out or repair quay, with floating drydock alongside, is in right center portion of view. 1943

ONI (HI) 459553

R. & H. Bd. Nikolayev, USSR

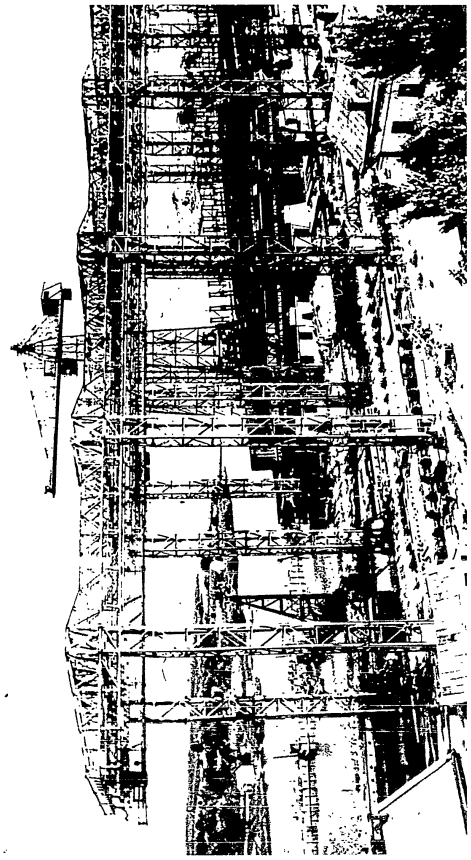


View looking NE showing portion of fitting-out and repair quay at the North Yard. Under-going repairs is German vessel "Cherson". Part of northern division of yard appears in immediate background. 1943

ONI (HI) 459567

FIGURE 25

R. & H. Bd. Nikolayev, USSR

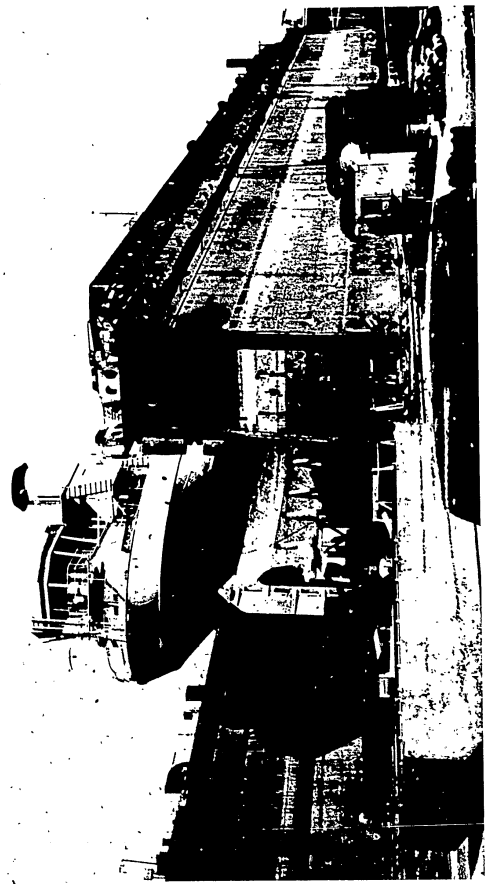


View looking NE showing the North Yard's 3 major shipbuilding slipways. 1943

ONI (HI) 459569

FIGURE 26

R. & H.. Bd. Nikolayev, USSR



View of 5,000-ton-capacity floating drydock in operation at the North Yard. Undergoing repairs is German vessel "Ossag". 1943

ONI (HI) 459554

FIGURE 27

R. & H. Bd. Nikolayev, USSR

labor force; however, in 1949 approximately 50 percent of the labor force were skilled or semiskilled, and approximately 35 to 50 percent of the total labor force were women. It is believed that the South Yard has the capacity and technological ability to produce all types of naval and commercial vessels, and is capable of accomplishing practically all abovewater repairs; its ability to accomplish underwater repairs is limited. In recent years the yard's facilities have been utilized almost entirely for the construction of naval vessels. This yard accounts for approximately 8.5 percent of the USSR's capacity for the building and repair of combat ships. It is believed that the types of vessels recently produced have been light cruisers of the Sverdlov or Chapayev class, long-range submarines, and a variety of small craft. The South Yard suffered considerable damage during World War II when 90 percent of its aboveground-level buildings were demolished. However, by 1949 the yard had been largely rebuilt and re-equipped and it is now capable of production at least equal to that of prewar years.

(b) North Yard (Imeni 61) - The North Yard is composed of 2 sections situated directly opposite each other on the Ingul River, about 1.5 statute miles eastward from the confluence of the Ingul and Yuzhnyy Bug Rivers. The southern, and principal division of the North Yard is located in northern Nikolayev and extends along the Ingul River for about 1 statute mile, covering an area of approximately 130 acres. The northern division of the yard lies directly across the Ingul River, extending along the river about 0.75 statute mile and covering an area of approximately 60 acres. The North Yard is the eighth largest shipyard in the USSR and, based on its production record, ranks second in the Black Sea area. The yard accounts for 4 percent of the national

capacity for building and repairing combat ships. Located within the principal section of the yard are 3 shipbuilding ways, 2 of which have lengths of 850 feet, and the third has a length of 1,170 feet, including its cofferdam extension. (Figures 23 through 26) This principal section also has a masonry-faced quay approximately 1,850 feet in length, and alongside depths of about 26 feet. Fitting-out and repair operations are carried out at this installation. Additional facilities include a marine railway, a floating drydock, a 40-ton floating crane, four 25-ton cantilever cranes, four 30-ton bridge cranes, eighteen 5-ton grabs, and approximately ten 3- to 4-ton locomotive cranes. The 2 sections of the yard are connected by a footbridge located in the vicinity of the shipbuilding ways, and by a timber highway structure located immediately beyond the yard's westernmost extension. There are indications that the construction of a third river crossing in this area was in progress in 1948. The North Yard's principal source of electrical power is the Nikolayev municipal thermoelectric power plant which has an estimated capacity of 67,000 kilowatts. This power is supplemented by the yard's own small power plant which has an estimated installed capacity of 2,000 kilowatts. The North Yard contains sea water pumping facilities and a water purification plant, which consists of 5 water tanks with a total capacity of 13,000 gallons. Fresh water is very scarce. The shipyard has a labor force of 9,700, of which possibly half are women. It is believed that the majority of male workers are skilled or semiskilled, but that only a small percentage of the women workers are skilled. The North Yard is capable of complete construction of vessels up to cruiser size. Also, it is capable of accomplishing major above water repairs to vessels up to cruiser size, and major underwater repairs to vessels up to

destroyer size. Postwar efforts have been primarily directed toward the construction of destroyers. However, barges and various types of small craft are believed to have been constructed here. During World War II the North Yard suffered severe damage, when approximately 80 percent of its installations were destroyed. It was completely rebuilt and expanded by 1948.

(2) Boatbuilding and repair yard - The Spassk Shipyard, located on the northwestern coast of Nikolayev immediately upstream from the Yuzhnyy Bug River bridge, contains a T-head concrete pier (approach, 125 feet; T-head, 170 feet), and one small slip. This minor installation constructs small iron hulls and can make repairs to small craft.

b. Details of docking installations

(1) Graving docks - None.

(2) Floating drydocks - Three floating drydocks are available at Nikolayev. All are located in the vicinity of the 2 principal shipyards. The largest drydock has a lifting capacity of approximately 5,000 tons and is located at the North Yard. The 2 smaller drydocks, each having lifting capacities of approximately 1,500 tons, are located in the vicinity of the South Yard. Available data are presented in the table of Floating Drydocks.

R. & H. Bd. CONFIDENTIAL Nikolayev, USSR

Floating Drydock

Name	...
Owner and Operator	Probably under naval administration.
Usual Location	Vicinity of South Yard.
Construction	Steel.
Dimensions (feet):	
Length overall	175 to 250
Length on blocks	n a
Width overall	80 to 100
Maximum depth over blocks	n a
Lifting Capacity in Tons	1,500
Crane Service	n a
Largest Vessel Handled	Capable of lifting several vessels of minesweeper size simultaneously.
Date Built and/or Rebuilt	Rebuilding operations began in 1949.
Remarks	The lifting capacity and all dimensions are approximations. This floating drydock is the salvaged center section of a 25,000-ton floating drydock which was scuttled in 1941 and resurfaced in 1948. The giant floating drydock was cut into 3 sections, probably equal, and the fore and aft sections were towed to an undetermined location. Repair operations began on this remaining center section in 1949, and it is considered likely that it has been completely repaired and is in operation.

R. & H. Bd. Nikolayev, USSR

Floating Drydock-Continued

Name	...
Owner and Operator	Probably under naval administration.
Usual Location	Vicinity of South Yard.
Construction	Steel.
Dimensions (feet):	
Length overall	165
Length on blocks	...
Width overall	65
Maximum depth over blocks	50
Lifting Capacity in Tons	1,500
Crane Service	n a
Largest Vessel Handled	n a
Date Built and/or Rebuilt	n a
Remarks	The lifting capacity and all dimensions are approximations.

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Floating Drydock-Continued

Name	...
Owner and Operator	Probably under naval administration.
Usual Location	Fitting-out quay in North Yard, 350 ft. eastward of marine railway.
Construction	Metal.
Dimensions (feet):	
Length overall	500
Length on blocks	n a
Width at entrance	80
Maximum depth over blocks	...
Lifting Capacity in Tons	5,000
Crane Service	4 portal jib cranes, capacities unknown.
Largest Vessel Handled	Destroyer.
Date Built and/or Rebuilt	Of prewar construction.
Remarks	All above figures are approximations. This floating drydock apparently remained undamaged throughout World War II, and is believed to have been in continuous service at Nikolayev since prewar days. Its present condition is fair. Utilities believed available to this floating drydock are electricity, compressed air, and water by a 4-in. pipeline. (Figure 27)

TABLE III

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SECRET

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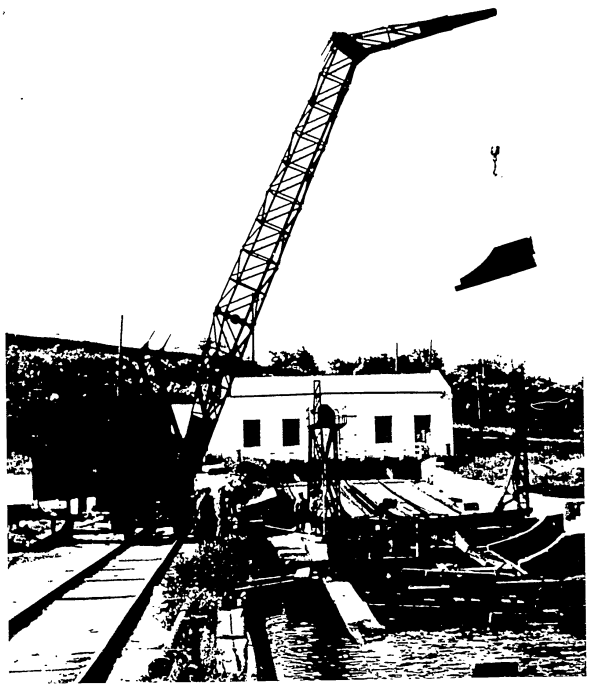

View looking W showing inner end of marine railway slip. Winch house can be seen directly to the rear of the slip.

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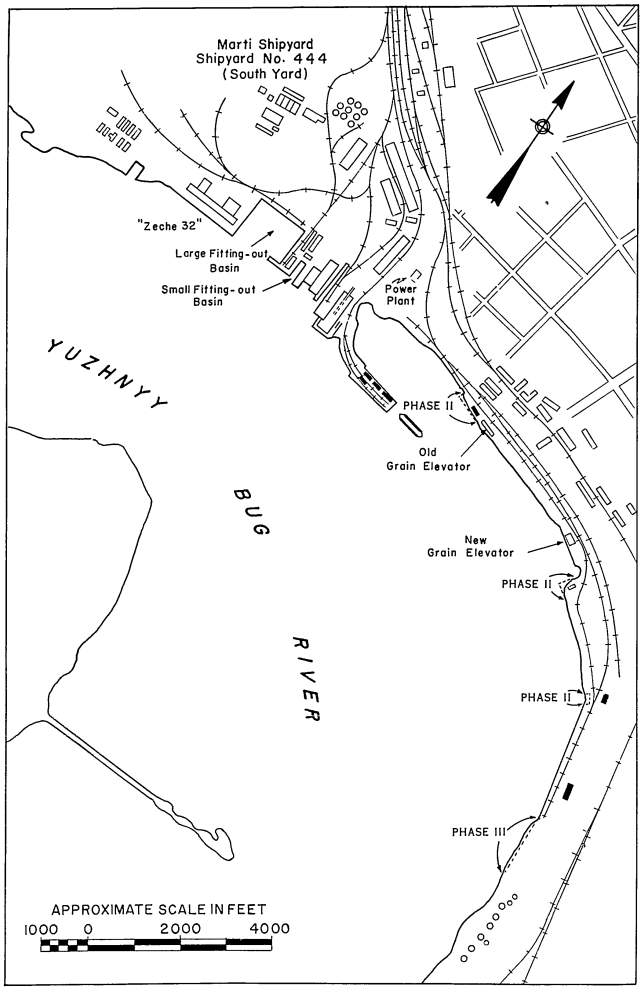
FIGURE 28

SECRET

R. & H. Bd. Nikolayev, USSR



Suggested plan of potential expansion and improvements.

FIGURE 29

R. & H. Bd. Nikolayev, USSR

(3) Marine railways - A marine railway with a reported capacity of approximately 500 tons is located at the western end of the fitting-out quay of the North Yard. It has an extreme length of 490 feet, a width of track support of 40 feet, and is constructed of reinforced concrete. Electric winches are used to haul the cradle, which consists of forty 4-wheeled sections of adjustable widths. Several locomotive cranes are capable of serving this marine railway via a parallel track. (Figure 28)

11. Planned development and improvements

There is no current knowledge of proposed port development or improvements at Nikolayev. Reports have stated that developments were under way in at least 3 separate localities in this area, and it is probable that these projects have been completed. The 3 reported projects included: (1) the straightening of the shoreline of the Yuzhnyy Bug River along the entire length of "Zeche 32" plant, and the construction of a 66-foot-wide quay at this location; (2) a minor commercial development on the right bank of the Yuzhnyy Bug River at Bol'shaya Korenikha which included channel and inshore dredging, and the construction of a new wharf; and (3) the construction of a new shipbuilding yard north of Bogdanovk, which is located on the right bank of the Yuzhnyy Bug River south of Nikolayev. No additional details are available.

12. Potentialities for expansion

a. Summary

The lack of adequate data on the port of Nikolayev precludes the development of a positive program to increase the port's military discharge capacity. A generalized plan (Figure 29), however, is suggested which is believed to be capable of increasing

the military discharge capacity of the port about 3,100 long tons per 20-hour day, or about 28 percent. This proposed plan consists of 2 phases, of which 1,600 long tons could be accomplished under Phase II, and 1,500 long tons under Phase III.

b. Phase I - The repair, improvement, and modernization of existing facilities, including minor dredging

Insufficient data on the condition of the port facilities make it impossible to present the amount of improvements necessary under Phase I.

c. Phase II - Suggested major improvements, additions, and extensions to existing facilities

The military discharge capacity of Nikolayev's existing commercial port facilities could be increased 1,600 long tons per 20-hour day by 2 principal means: (1) the full utilization of the commercial port's present water frontage which would provide an additional 1,100 feet of berthing space; and (2) a 500-foot westward extension of Granite Quay (wharf Ref. 2). The primary requirement of Phase II would be the construction of a sheet pile bulkhead or pile marginal wharf along the commercial port's unimproved or unused water frontage. Clearance facilities may have to be expanded to accommodate additional traffic. Available information indicates that this could readily be accomplished. Dredging operations, if required, would be minor.

d. Phase III - Suggested locations of new wharves

The military discharge capacity of Nikolayev could be increased 1,500 long tons per 20-hour day by developing the left bank of the Yuzhnyy Bug River immediately southward of the International Quay (wharf Ref. 4). This site offers a water frontage of approximately 1,500 linear feet, and a sheet pile bulkhead or pile marginal wharf is also suggested as being the

most expedient type of construction for its development. Adequate rail clearance can be achieved by the southward extension of the rail lines located on International Quay; road clearance also can be readily accomplished. Moderate dredging operations would be required and cold weather storage should be provided.

Three nearby villages - Varvarovka, Bol'shaya Korenikha, and Malaya Korenikha - situated on the right bank of the Yuzhnyy Bug River appear to be favorable sites for new pier or wharf construction. The development of these sites is, however, of questionable feasibility; therefore, it is not included as a potential means of increasing the port's military discharge capacity.

13. Construction data

a. Availability of construction materials

Sand and gravel are obtained by dredging operations from the Yuzhnyy Bug and Ingul Rivers. Suitable fill material is obtained by dredging or inland excavating operations. The existence of limestone outcrops and clay supplies, and the apparent availability of slag from steel mill activities indicate the possible use of these materials for the operation of the cement and stone-crushing plant, the brick and cinder-block plant, and the additional brick plants that reportedly are located in the vicinity of Nikolayev. Some of Nikolayev's principal imports include dolomite from the Donets Basin, lime from Sebino (located on the Yuzhnyy Bug River), and timber, probably acquired from Germany and Austria and shipped through Rumania.

b. Weather and climatic factors affecting construction

The weather and climatic conditions inherent to Nikolayev favorably allow the conduction of construction activities throughout the greater portion of the year; the majority of

deterrent factors occur during the winter months.

Nikolayev has an annual mean temperature of 50°F., however, recorded extreme temperatures range from -22°F to 103°F. The month of July has a highest mean temperature of 74°F.; the months of December, January, and February have below freezing mean temperatures of 30°F., 24°F., and 27°F., respectively. Ice has appeared on the Yuzhnyy Bug River in November and occasionally remained until April, however, it usually occurs from mid-December to early March. The average annual maximum thickness of the ice is 14 inches, and the maximum thickness recorded is 24 inches.

Rain occurs on an average of 81 days per year with an average annual rainfall of 14.54 inches. There is no appreciable rainy season at Nikolayev; the months of May, June, and July have the highest monthly rainfalls. Snowfalls occur, for the most part, in December and reach heights of 6 to 8 inches. The mean annual relative humidity is 76 percent, and fogs occur on an average of 34 days per year, most frequently from October to March.

Winds in this region vary in direction throughout the year; northeasterly winds are most prevalent. An average of 90 days of calm occur annually, and gales occur on an average of 21 days per year. The mean annual wind force, Beaufort's scale, is 2.9, the higher monthly mean wind forces occur during the colder months of the year.

Tides and tidal currents at Nikolayev are negligible, however, the water level can be raised or lowered 3 feet by winds and sudden atmospheric pressure changes. Water levels are also raised by the discharge of the Yuzhnyy Bug River, particularly during spring freshets.

c. Labor and craftsmen factors

The civilian labor force (1950 estimate) of Nikolayev and its neighboring communities numbers 90,000, of which approximately 49 percent are women. Industries in this area utilize 50 percent of the civilian labor force; about 65 percent of the industrial workers are employed in the shipyards. Eleven percent of the total labor force is employed in transportation, and another 11 percent is employed in commerce. An estimated 6 percent of the civilian labor force, including about 3,000 forced laborers, are utilized in housing construction and minor industrial expansion. Within the area there are 45,000 workers including 17,000 foremen, craftsmen, local administrators, and public servants, 13,000 lower service personnel and apprentices, and 5,000 professional, managerial, and technical personnel.

Information concerning the efficiency, morale, and cooperation of the civilian labor force is available only from those workers employed in the shipyards. The shipyard workers are required to meet norms which often result in sacrificing quality for quantity in their production. Skilled workers generally meet their norms which are believed to be reasonable, however, unskilled workers generally do not. There are shortages of skilled laborers, such as lathe operators, and apprentice programs are in effect. Morale is generally low, especially as some of the workers are doing compulsory work as punishment. Complaints of high prices, low wages, and periodic irregularity in payment of workers have also caused wide discontent.

General living conditions are below the prewar level. Families must often share one room and food and clothing are slightly more than adequate.

d. Foundation conditions

Nikolayev is built on soil predominantly composed of sand and gravel and containing, in some locations, clayey deposits. Limestone outcrops are reported in this area.

Mud is found in the deeper portions of the Yuzhnyy Bug River bed; sand deposits appear in the shoal areas. Seismic activity in this area is negligible.

e. Water supply

The Yuzhnyy Bug and Ingul Rivers provide ample quantities of water for industrial and domestic use; wells in the area are used primarily to supply local needs. The river water supply is adequate, however, both the Yuzhnyy Bug and Ingul Rivers contain brackish water. A municipal waterworks, small pumping stations, water towers, and wells provide the area with an adequate supply of fresh water. The treated fresh water supply contains a considerable amount of chlorine and is boiled before drinking.

f. Electric power

An independent municipal thermoelectric power plant, capable of generating about 67,000 kilowatts, serves the entire port area and supplements the output of 2 smaller power plants which have a total estimated capacity of approximately 5,000 kilowatts and serve only industrial installations. These 3 plants provide approximately 85 percent of the port area's power requirements; the remainder is supplied by the Dnepr-Donets Power Grid. Distributed current characteristics are believed to be 3-phase, 50-cycle, 220/380-volt, a. c.

A direct connection with the Dnepr-Donets Power Grid is made via a 110-kilovolt line leading from the transformer substation of the municipal power plant. Connections between the 2 small power plants and the power grid probably are made through

this line. Another high-tension line leads from the municipal power plant and extends eastward and then south-southeastward, paralleling the Yuzhnyy Bug River for about 3 statute miles to an unknown destination.

g. Fuel

Nikolayev stocks about 6,000 tons of coal which it receives from the Donets Basin. The total amount of petroleum stored at Nikolayev is not known; however, numerous storage facilities do exist and available petroleum products are known to include fuel oil, gasoline, and kerosene imported from Odessa.

14. Points of vulnerability in the port area

a. Summary

Nikolayev is of prime strategic importance. It is the second largest center for the building and repair of combat ships in the USSR, and the second largest commercial port in the Black Sea area.

A natural river port, Nikolayev does not appear to be susceptible to closure for extended periods. Its vulnerability is attributed primarily to heavy concentrations of industrial installations and commercial port facilities, and to a restricted river approach.

The civilian population of the area are not believed dependent on the port for their subsistence, however, port operations would probably be vital for the support of military activities in this region.

b. Vulnerable points

The vulnerable points are listed below and are shown on the annotated map, Figure 30.

Ref. on Fig. 30	Description
1	Locations of principal berthing facilities
2	Concentration of warehouses
3	Constriction in channelized river approach
4	Railroad classification and storage yards
5	Highway bridges carrying principal routes of clearance
6	Tank storage
7	Fitting-out and repair berths
8	Municipal thermoelectric power plant
9	Marine railway
10	Floating drydocks

15. Comments on principal sources

The data used in compiling this study were secured entirely from the Washington area. The rigid security measures in effect at the port of Nikolayev make it extremely difficult to obtain recent and detailed information. The majority of documents reviewed in the preparation of this study were reports containing information acquired before 1950. However, several more recent reports and studies with a relatively high degree of reliability were also utilized.

The outstanding deficiencies included a lack of recent close-range photography, and a lack of detailed data, including sectional views, with regard to the port's terminal, storage, and shipbuilding and repair facilities.

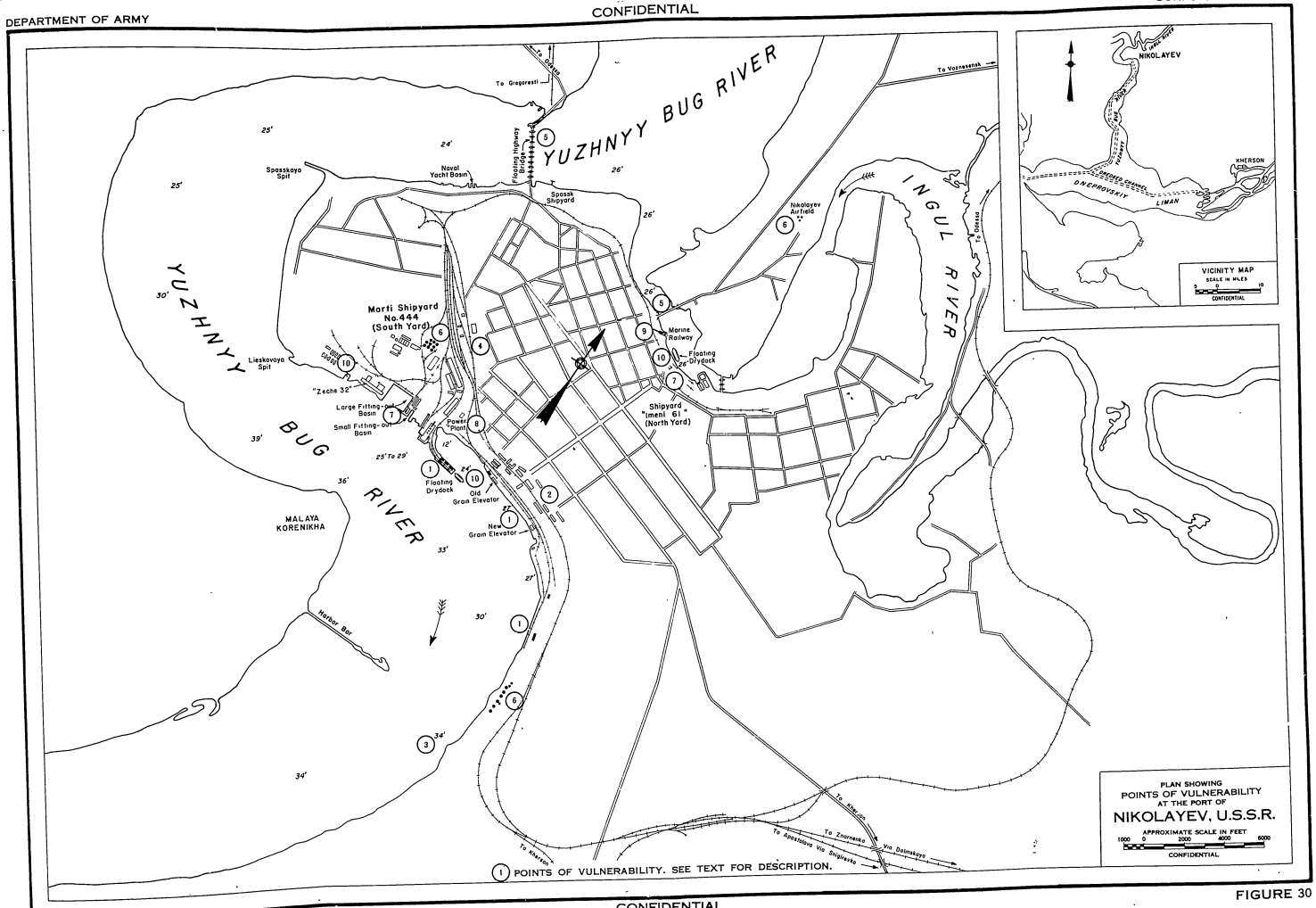


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FIGURE 30

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SUMMARY OF PORT FACILITIES

R. & H. Bd.

Nikolayev, USSR

HARBOR AND ENTRANCE

Harbor

The river harbor has a water surface area of about 9 sq. naut. miles, and general depths of 25 to 30 ft.

The approach from open waters of the Black Sea is through the Dneprovskiy Liman and thence up the Yuzhnyy Bug River. Pilotage is compulsory.

Entrance channel

A dredged channel, 330 to 350 ft. in width, and about 37 naut. miles in length, through the Dneprovskiy Liman and the Yuzhnyy Bug, permits passage of vessels drawing up to 27 ft.

ANCHORAGES

Anchorage is allowed at the mouth of the Yuzhnyy Bug River, but it is not allowed in the roadstead. Vessels may go alongside the quays of commercial harbor in depths of 25 to 29 ft., and secure to buoys. The commercial harbor area is well protected from winds and has good holding ground over mud. Warships anchor at the confluence of the Ingul and Yuzhnyy Bug Rivers in depths of about 15 to 20 ft.

HYDROGRAPHIC CONDITIONS AFFECTING NAVIGATION

Tides and tidal currents are negligible. Winds and sudden atmospheric pressure changes can raise or lower the water level 3 ft. Ice, averaging 14 in. in thickness, occurs from mid-December to early March. Icebreakers keep the port open to navigation. Fog occurs on an average of 34 days/yr.

WHARVES

Usable Berthing Space (feet)	Depths Alongside (feet)	Total No. of Berths (by class)
	COMMERCIAL	
	General Cargo	
8,965	24 and over	14 - A
1,085	19 to 24	3 - B
400	16 to 19	3 - C
		8 - D
540	12 to 16	3 lighters
10,990		
	NAVAL	
	Fitting-out and Repair	
2,350	24 and over	...
2,500	19 to 24	...
1,000	Unknown	...
5,850		
16,840		

ESTIMATED MILITARY PORT CAPACITY

The estimated military unloading capacity at Nikolayev is 10,990 long tons of general cargo/20-hr. day.

A phased study of the port's expansion possibilities indicates that its capacity could be increased about 3,100 long tons.

MECHANICAL HANDLING FACILITIES

No.	Capacity (tons)	Type
	Cranes ashore	
4	4	Electric traveling
3	3	do
1	n a	Shearlegs
Several	3 to 4	Steam locomotive

MECHANICAL HANDLING FACILITIES-Continued

No.	Capacity (tons)	Type
	Floating cranes	
1	150	...
1	50	...
5	25 to 40	...
1	17	...
1	3	...

Specialized handling equipment

3 floating grain elevators.

PORT MAINTENANCE AND ENGINEER EQUIPMENT AFLOAT

Tugs

15 to 20 tugs reported in operation in the port area.

Dredges

One diesel-powered self-propelled bucket conveyor dredge, and 2 steam-powered, non-self-propelled dredging barges reported in operation.

Pilediver

1 floating piledriver is available.

Salvage equipment

Tanks for salvage purposes were being produced at the North Yard. Two types of diving equipment also in use.

Fireboats

4 fireboats are maintained at Nikolayev.

Icebreakers

Two icebreakers are in operation at the port.

HARDS AND UNIMPROVED SITES USABLE FOR CARGO LANDING WITHIN THE PORT

The left shoreline of the Yuzhnyy Bug River from Leskovaya Spit to the Yuzhnyy Bug River bridge probably could be utilized as a cargo landing site. This shoreline is mostly clear of obstructions, and has an offshore bottom sediment of sand. The river bed slopes uniformly outward from the shoreline until a deep drop is encountered. Clearance from this area could be achieved by the utilization of a single-track, 5-ft-gage rail line and a road which are located nearby.

STORAGE FACILITIES

General cargo warehouses

17 warehouses - 294,000 sq.ft.

Food storage

4 buildings (Nikolayev Airfield) - Area, n a.

5 semiburied warehouses (Commercial port area) - 10,000 sq.ft.

16 buildings (N of Varvarovka) - 14,580 sq.ft.

Tank storage

Petroleum and petroleum products

On left bank of Yuzhnyy Bug River - 26 tanks (17 semiburied).

N of South Yard's large fitting-out basin - 18 tanks - 180,100 bbl.

South Yard - 4 tanks.

NE section of North Yard - Underground storage depots of 250-bbl. capacity.

Nikolayev Airfield - 3 tanks.

Nikolayev/Kubakino Airfield - Underground storage of unknown capacity.

Left bank of Yuzhnyy Bug River immediately N of highway bridge - 3 tanks.

SSE of Coastwise Trade Mole - 5 tanks.

Other

8 barges - 9,600-bbl. capacity each.

Grain elevators

2 are located on Granite Quay.

New (East) grain elevator - 3 elevators, 144 silos. Total capacity, 1,500,000 bu. Loading rate, 46,000 bu./hr.

Old (West) grain elevator - 4 elevators, capacity, 477,000 bu.

3 floating grain elevators are also in operation at the port.

Open storage

Ample space to rear of quays in commercial port. Total open storage area, about 44 acres.

CLEARANCE FACILITIES

Rail

Nikolayev is served by 4 single-track, 5-ft.-gage rail lines which provide connections with all parts of the USSR. These rail lines lead NNE to Znamenka and Apostolovo, SE to Kherson, and S to Odessa.

Wharves in both the commercial and naval sections of the port are served by single- or double-track 5-ft.-gage rail spurs which connect to the main line in the Nikolayev yards area. From this yard area the main line runs behind the quays in the commercial port and leaves the city at its SE end.

The Nikolayev railroad station, yards and shops section contain the principal rail facilities of the city; 5 smaller storage yards serve local outlying sections.

Road

Nikolayev is served by 4 secondary roads linked with the road network of the region. Two of these roads are hard-surface, all-weather roads leading SW to Odessa, and SE to Kherson; the remaining 2 are loose-surface, dry-weather roads leading N to Kirovograd and NW to Voznesensk.

The street pattern in Nikolayev is rectangular. Street widths vary from 16 to 39 ft., except for the main street which has a width of 98 ft. The condition of the streets ranges from fair to poor.

Two highway bridges, the Yuzhnyy Bug River bridge and the Ingul River bridge, carry principal routes from the city.

Inland waterways

The Yuzhnyy Bug River is navigable about 52 naut. miles above Nikolayev.

Oil pipelines

No data are available.

SHIP SUPPLIES

Fuel

International Quay and the Naval Fueling Station contain both coal handling and petroleum bunkering facilities. The oil-bunkering pier and a petroleum storage area about 1.5 statute miles S of International Quay contain petroleum bunkering facilities; City Quay contains coal handling facilities.

Utilities

Water

Fresh water is believed available at all wharves in the commercial harbor with the exception of the International Quay. Water is available in both shipyards.

Electricity

Electricity is believed available at most of the quays, and is adequate at both shipyards. Distributed current characteristics are 3-phase, 50-cycle, 220/380-v., a.c.

SHIPBUILDING AND REPAIR

South Yard (Marti Shipyard No. 444)

The South Yard is the principal shipyard in the Black Sea area. Its facilities include 7 shipbuilding ways, and 2 fitting-out basins, which provide about 4,000 linear feet of quayage. This yard is believed to have available the services of 2 floating drydocks, 2 floating cranes, 8 tower cantilever cranes, 15 to 20 locomotive jib cranes, and possibly a number of bridge cranes. Electric power is derived from the Nikolayev municipal power plant and the shipyard's own small power plant. Water is obtained from the Yuzhnyy Bug River. The yard employs an estimated labor force of 35,000 to 45,000.

North Yard (Imeni 61)

The North Yard contains 3 shipbuilding ways, a 1,850-ft. masonry-faced fitting-out quay, and a marine railway. Additional facilities include a floating drydock, a floating crane, 4 cantilever cranes, 4 bridge cranes, 18 grabs, and about 10 locomotive cranes. Electric power is supplied by the Nikolayev municipal power plant and supplemented by a small power plant located within the yard. River water pumping facilities and a water purification plant are also located within the yard. The North Yard employs a total labor force of 9,700.

SHIPBUILDING AND REPAIR-Continued

Boatbuilding and repair yard

The Spassk Shipyard contains a concrete T-head pier and 1 small slip. This minor installation constructs small iron hulls and is capable of carrying out repairs to small craft.

Floating drydocks

3 floating drydocks are located at or in the vicinity of the 2 principal shipyards. The largest has an approx. lifting capacity of 5,000 tons; the 2 smaller drydocks are located in the vicinity of the South Yard, and both have approx. lifting capacities of 1,500 tons.

Marine railways

A marine railway, with a reported capacity of about 500 tons, is located at the western end of the fitting-out quay of the North Yard.

PLANNED DEVELOPMENT AND IMPROVEMENTS

Developments were reportedly under way and included the straightening of the Yuzhnyy Bug River shoreline, and the construction of a quay along the entire length of "Zeche 32" plant; a minor commercial development at Bol'shaya Korenikha; and the construction of a new shipbuilding yard at Bogdanovk, S of Nikolayev.

POTENTIALITIES FOR EXPANSION

The port's military discharge capacity can be increased about 1,600 tons under Phase II and 1,500 tons under Phase III.

Phase II includes: (1) the full utilization of the commercial port's present water frontage providing an additional 1,100 ft. of berthing space, and (2) a 500-ft. westward extension of Granite Quay.

Phase III includes the development of 1,500 ft. of the Yuzhnyy Bug River's left shoreline immediately southward of the International Quay.

CONSTRUCTION DATA

Availability of construction materials

Sand and gravel are obtained by dredging, suitable fill material is available by dredging or inland excavating operations. Quantities of limestone may be obtained locally. Timber must be imported.

Weather and climatic factors affecting construction

Climatic conditions are favorable for construction activities throughout the greater portion of the year. The mean annual temperature is 50°F., with the highest mean temperature of 74°F. occurring in July, and the lowest of 24°F. occurring in January. Ice occasionally appears in November and disappears in early March. The average annual thickness of the ice is 14 inches.

Labor and craftsmen factors

Within the area are 43,000 workers, including 17,000 foremen, craftsmen, local administrators, and public servants, 13,000 lower service personnel and apprentices, and, 5,000 professional, managerial, and technical personnel. Approximately 49 percent of the total force are women. A shortage of skilled laborers exists in the shipyard, and the morale is low.

Foundation conditions

Nikolayev is built on soil predominantly composed of sand and gravel; clay deposits and limestone outcrops are present. Mud occurs in the deeper portions of the Yuzhnyy Bug River bed; sand deposits appear in the shoal areas.

Water supply

A municipal waterworks, small pumping stations, water towers, and wells provide the area with an adequate supply of fresh water. The river waters are brackish, and the treated fresh water is boiled when used for drinking purposes.

CONSTRUCTION DATA-Continued

Electric power

The municipal thermoelectric power plant, capable of generating about 67,000 kw., serves the port area. Two smaller power plants having a capacity of about 5,000 kw. serve only industrial installations. These 3 installations provide approximately 85 percent of the port area's power requirements; the remainder is supplied by the Dnepr-Donets Power Grid. Current characteristics are 3-phase, 50-cycle, 220/380-v., a.c.

Fuel

Petroleum

The total amount of storage is unknown, however, numerous storage facilities do exist and available petroleum products include fuel oil, gasoline, and kerosene.

Coal

Nikolayev stocks about 6,000 tons.

POINTS OF VULNERABILITY IN THE PORT AREA

Nikolayev is of prime strategic importance because of its prominent naval shipbuilding and commercial port activities. It is a natural river port, thus is not apparently susceptible to closure for extended periods; its vulnerability is attributed to the location of installations. The principal points of vulnerability include concentrations of quays, storage buildings, tank storage, shipyard and clearance facilities, a thermoelectic power plant, and a restricted river approach.

GENERAL REMARKS

Nikolayev is located on the left bank of the Yuzhnyy Bug River about 23 naut. miles N of its entrance into the Dneprovskiy Liman, an arm of the Black Sea. The city is the second largest center for the building and repair of combat ships in the USSR, ranking next to Leningrad. As a commercial port, it ranks second to Odessa in the Black Sea area, with respect to annual volume of freight turnover. Nikolayev serves as an export center for products of the Ukraine, however, in recent years the emphasis has shifted to coastal trade. The principal exports are iron ore, manganese ore, and grain; principal imports are timber, petroleum, manufactured goods, and ferroalloys. The city had an estimated population of 225.000 in 1956.

TABLE IV

CONFIDENTIAL

DEPARTMENT OF ARMY

CORPS OF ENGINEERS

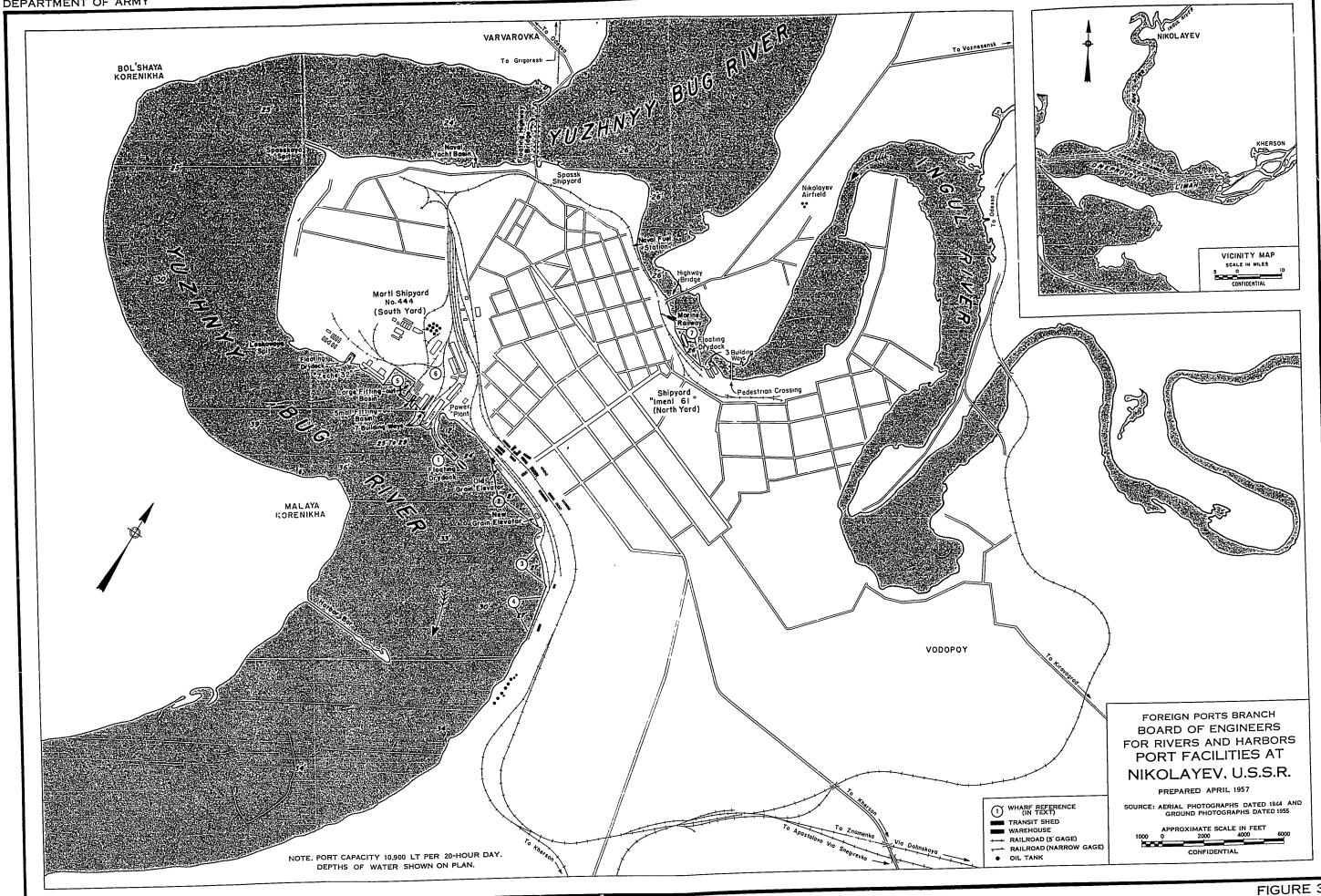
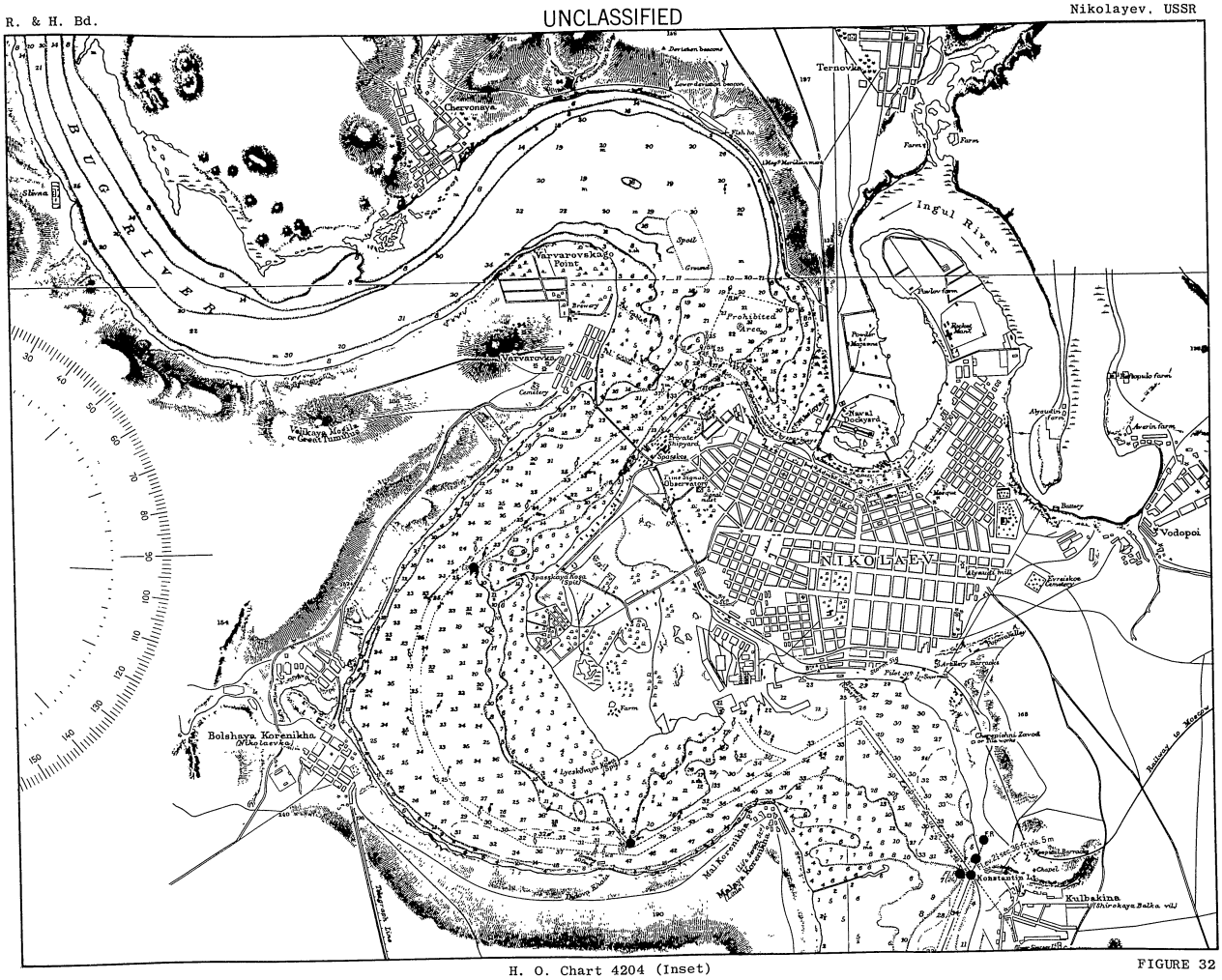


FIGURE 31



H. O. Chart 4204 (Inset)

FIGURE 32

STAT